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THE SURGICAL CLINICS OF NORTH AMERICA

Volume 3

Number 5

CONTRIBUTION BY DR ROBERT EMMETT FARR

ST MARY'S HOSPITAL MINNEAPOLIS

SOME HELPFUL SURGICAL ADJUNCTS AND METHODS

WHILE realizing fully that principles should not be lost sight of while one is engrossed in detail the fact is patent that the meeting of indications in surgery is nothing more than the proper correlation in carrying out an infinite number and variety of details. Thus such matters as the healing of wounds the cause and control of hemorrhage the prevention and treatment of sepsis drainage of the bladder under certain conditions and so forth are the underlying principles of which this article treats.

In this message I shall detail briefly a number of adjuncts which I have used in my routine surgical work. Most of them are of minor importance and some are only modifications of the methods of others. They are presented with the hope that other surgeons may find them an aid in carrying out the routine work which confronts us all. Any appliance or method which in the slightest degree reduces the patient's discomfort or decreases his risk or which makes the surgeon's task a whit less onerous is worth while.

Many factors have influenced the development of surgical detail. In the pre anesthesia era it was necessary to sacrifice many essential details and violate principles on account of the necessity for speed. The development of anesthesia reduced but did not entirely eliminate the necessity for dispatch in carrying out operative procedures. The discovery of the cause

of sepsis focused the surgical mind upon its prevention when operating

Thus the surgeon of today is not confronted by the many difficult problems of his forefathers—many questions which quite fully occupied their minds are now solved at least to such an extent that they are no longer the chief source of worry. He has more time at his disposal in which to improvise appliances and methods in addition to those which are now available and which are a great improvement over those of earlier days.

The following is presented therefore with a view to offering for what they may be worth a few minor aid to surgeons in applying well established principles in doing their work.

THE APPLICATION OF RUBBER ETHER CEMENT TO SURGERY

Sorici and others have called attention to some of the uses to which rubber cement may be put with advantage. A somewhat extended experience with this solution lead the writer to the conclusion that some of its many advantages should from time to time be brought to the attention of the profession.

Rubber ether cement is made up in the following proportions. Use 1 part of rubber cement to from 4 to 5 parts of ether.

Uses.—Sorici states that this solution may be used routinely for sterilizing the skin and that when it is applied it is unnecessary to use towel or gauze to prevent the abdominal viscera from coming in contact with the former. Our experience coincides with him in this respect. Murphy used a somewhat similar solution for the skin and hands many years ago and indeed at one period he contended that when it was used rubber gloves were unnecessary. We have found three uses for the solution which are most gratifying.

The first and most important is its application to all skin surfaces which after operation are apt to be subjected to more or less constant moisture. The most important of these are cases in which fistulous openings connected with the pancreatic or gastric secretions are made. The duodenum stomach jejunum or gall bladder or drainage of the pancreas itself furnish

the most disagreeable fistule on account of the great liability of skin digestion from the secretions which flow from the e organs. About the face the oral ecretions may produce the same effect though to a less degree. Suprapubic cystostomy is another offender along this line as is any fistula connecting the skin with the urinary tract. Colostomy call for the same application.

The second condition to which I wish e pecially to call attention is in cases of suppuration in which Dakin's solution is being employed. Here the use of the rubber cement solution is so much more simple clean and economical that we have discarded vaselin gauze entirely.

A third important function of the cement is as an adjunct to the application of rubber adhesive plaster to the skin—e pecially when extension is to be applied as suggested also by Soris. He showed that by using the rubber solution upon the skin before applying adhesive strips the cohesive quality of the latter is increased many fold.

Rubber cement may be purchased at small cost dissolved in ether and kept in a glass bottle. It may be painted upon the skin by means of a gauze pledget or an applicator. Several coats should be applied at a sitting and care should be taken to see that the surface is dry and clean before the application is made. It disappears within a few days and should be renewed whenever a further application is indicated.

THE SHOE HOOK ADHESIVE DRESSING

I am indebted to Dr. L. L. McArthur of Chicago for the combination of the shoe hook and adhesive plaster as a means for holding in place surgical dressings. Since my attention was called to the method by this most ingenious surgeon I have used it routinely in my practice substituting for the tapes used by Dr. McArthur ordinary rubber band (Figs. 493, 494).

The stamp employed for placing the hooks may be obtained at any shoemakers supply house and at small cost.

The adhesive straps may be cut in appropriate lengths and sizes and the hooks stamped into them after which they may be

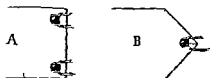
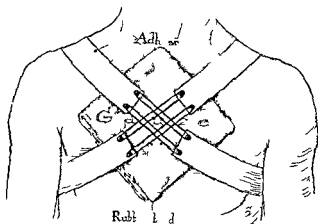


Fig 493—Sh e h o k d h e e d t g a p p l e d t h t A d B Method
o f f l d g d h e

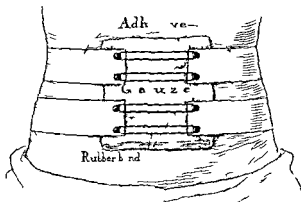


Fig 494—Sh h o o k d h t e d g p p l d t b d o m

kept in readiness with the dressing room or operating room supplies—the crinoline facing of course being left in place In the hospital where a large number of the adhesive straps are

used it is found advantageous to have them prepared in pairs with the adhesive sides opposing and these may be separated as needed to apply the dressing. The ends of the adhesive strips may be folded as illustrated in Fig 495 A and B.

The use of rubber bands insures against slipping of the dressing even in ambulatory cases and the elastic pressure furnished while not sufficient to be disagreeable is oftentimes desirable furthermore the elastic bands are most easily obtained and have the additional attribute of cleanliness. The use of the straps is of course not limited to the areas shown in the figures but is practicable on any rounded surface as the thigh the kidney region the thorax and the neck as in thyroidectomy laryngectomy or esophageal surgery.

THE AUTOMATIC WIRE SPRING RETRACTOR

The wire spring retractor has probably been used for ages. The principle is an old one and no claim for priority accompanies this description of the instrument the modifications of which the writer has devised. My main reasons for referring to it in more detail than I have employed in former articles in which I have recorded some of its advantages when using local anesthesia are first my belief founded upon personal experience that its advantages are not generally appreciated and second the universal interest shown by all visiting surgeons upon seeing the instrument in use and their enthusiasm after using it themselves.

Its application is so universal and it may be used for such a variety of purposes—some of which will be detailed below—that further description may lead to a wider appreciation of its merits.

Varieties—The wire spring retractor as the writer has modified it is available in a variety of sizes and shapes and each model may be applied to a great variety of incisions. The instrument is also useful in suppurating wounds as described below. Figure 495 shows retractors Nos 1 2 3 and 4. The application of 1 2 and 3 is obvious. No 1 is used in the smaller and more superficial incisions. No 2 may be used in all kinds of incisions and is of special efficiency in separating the labia when

doing operation upon the perineum or in any vaginal operation. Placed at right angles to each other in the rectum they will effectually expose the mucosa. They may be placed between the folds of the buttocks in adipose patients in order to improve the exposure. No 3 may be used in deeper wounds especially for separating the muscular and fascial layers. No 4 may be used in bladder, rectum, vagina or abdomen. Nos 5, 6 and 7 (Fig 496) are designated for use in abdominal work.

Nos 5 and 6 it will be noted present a loop upon one side and a sharp point upon the other. The point engages the muscle or aponeurosis while the loop which is short and curved in No 5

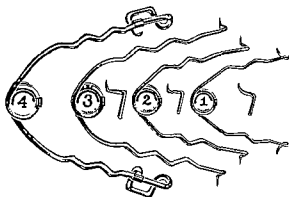


Fig 49 — A t m t p g t t N 1 2 3 d 4

engages the opposite wall including all layers and if placed diagonally in the midline pelvic incision it will retract downward and outward. No 6 differs from No 5 in that its loop is longer. Its special function is to retain the viscera in position in intraperitoneal work. In the pelvis after displacing the intestines into the upper abdomen two of these are placed diagonally the sharp point engaging the muscle of the abdominal wall below and the long loop making elastic pressure in each lateral half of the abdomen. In the upper abdomen the No 6 may be used to carry the colon, stomach or duodenum out of the field. No 5 will apply here also and No 7 has the merits of both in that the abdominal wall is retracted by the short loop while the

viscera are excluded from the field by the long one. This instrument also has the advantage that the arms are longer and well out of the field.

Special Advantages—It has seemed to the writer that these retractors more nearly meet the demands of the patient's best interests and more effectually perform the service demanded by the surgeon than does any other variety of self-retaining retractor. They make a constant elastic pressure upon the tissues and cannot traumatize them. By their use the incision is grad-

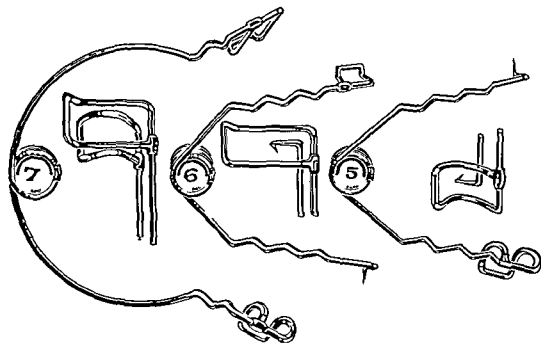


Fig. 496—Automatic wire spring retractors Nos. 5, 6, and 7.

ually enlarged without tearing the structures. Movable viscera are pressed out of the field only as far as they will easily yield.

One of the most important points relates to the elimination of one assistant. These retractors will perform the function of retraction more effectually than any assistant can possibly do it and they are always on the job.

Another point relates to the small amount of space required for even a large number of them. They may be superimposed

upon each other or introduced so as to make the incision circular if one so desires

It is to be noted that the arms of these retractors are wrinkled so that they may be firmly held in the hand and yet they present no rings or other devices upon the sides which might entangle the ligatures

The strength or pull of each instrument may be regulated at will by the surgeon as it is quite dependent upon the spread of the arms

We have used them a number of times in separating the opposing surfaces of suppurating wounds. They are superior to gauze tubes or other drainage material for this purpose

And finally they are comparatively inexpensive and will last indefinitely

A WOUND CONTRACTOR

The wound contractor (Fig 497) has been devised for the purpose of furnishing the surgeon with a simple means of approximating the opposite skin edges in the case of a great variety of wounds. It may be applied in the case of granulating areas in order to hasten the approach of the skin edges toward each other (Fig 497) also to incised wounds which have separated on account of suppuration or for other reasons. It may be used in order to relieve tension upon sutured wounds when indicated

The instrument has the following attributes. It furnishes one an elastic force which is often desirable. It allows the use of adhesive traction without in any manner interfering with the wound surfaces. It is inexpensive and sterilizable

The illustration (Fig 497) shows the application of the contractor. The amount of traction applied may be graduated to suit the individual case. Its regulation is brought about in the following manner. First the instrument is constructed in three different sizes of wire and therefore is of different degrees of strength. Second the spread of the instrument may be varied to suit the indications—the wider the spread the more vigorous will be the pull. If in any instance it is necessary to place the adhesive straps at a fixed distance from each other

the spread of the contractor may be increased or decreased at will by forcibly modifying the width of its blades. If a still greater pull is desired additional contractors may be applied.

The adhesive tapes of any width should be reinforced at the end which approximates the wound by folding them over a small strip of wood. A match or a portion of an applicator or tongue depressor will answer the purpose. After placing the adhesive strips the contractor may be applied in such a manner

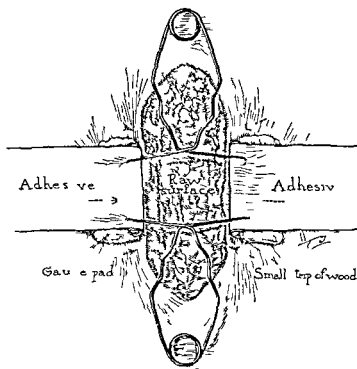


Fig. 497.—Wound contractor a ding in approximating the skin edges

as to equalize the pull upon the edges of the adhesive tape. Wide areas may require the application of two or more contractors. However the proper placing of the instrument will through the agency of the reinforcing strips of wood distribute the force perfectly regardless of the number used.

The contractor can be used with great satisfaction after hare lip operations and amputations of the breast where it is so frequently desirable to relieve the tension upon the sutures.

COSMETICS IN OPERATION FOR UMBILICAL HERNIA

Other things being equal the complete fulfilment of surgical indications demands the retention or restoration of tissues or structures to a relation as nearly normal as possible following any surgical operation. While operations upon the exposed portions are relatively more exacting and make greater demands relatively speaking it is desirable from a cosmetic standpoint to carry out operations upon any surface of the body with an eye to the cosmetic result. Women for instance are exceedingly thankful when the plastic resection of the breast is carried out

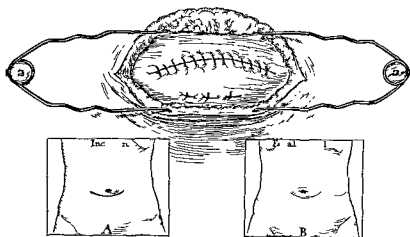


Fig. 498—C m t p t f m b l l h A I B
F l ult

and a benign tumor is removed without leaving a disfiguring scar. The same may be said of the results of the Pfannenstiel incision. The mental effect of disfiguring operations even though they occur on portions of the body that do not show is by no means negligible and is not confined to the female sex alone—in fact personal experience would lead me to believe that the male is more exacting than the female in this regard.

We have for a number of years conserved the skin outline of the umbilicus in carrying out the operation for the radical cure of certain types of umbilical hernia. The operation is applicable to the less advanced types. Obviously in cases in

which the configuration of the navel has been entirely obliterated the cosmetic operation is not indicated so clearly (Fig 498)

The operation is carried out as follows A slightly curved transverse incision is made below the navel and the skin flap dissected upward (Fig 498) The indicated operation is then carried out and the navel made to simulate its former appearance In some instances the umbilicus will if not excised quite naturally take on the appearance of the normal However a normal appearing navel may be constructed by drawing down an inverted tent of skin and attaching it to the aponeurosis The more simple forms of umbilical hernia may be easily repaired through a single incision as when the umbilicus has been excised and we have found that all classes of patients express their appreciation of the cosmetic result obtained

THE PREOPERATIVE VAGINAL PACK AS AN ADJUNCT TO ABDOMINAL PELVIC SURGERY

The writer has made use of preliminary packing of the vaginal vault with sterile gauze as an adjunct to abdominal pelvic operations as a routine measure Its use has been made to serve two purposes First the elevation of the uterus and second as an aid in placing vaginal pelvic drainage

1 **Elevation of the Uterus**—The performance of abdominal operations under local anesthesia suggested the use of the vaginal pack as a preliminary in simple cases of retroversion It is well known that the dislodgment of the retroverted uterus and its elevation to a proper position may in some instances cause a patient more or less distress during an operation under local anesthesia In an effort to avoid this unpleasant step in the operation a careful preliminary packing of the vaginal vault with sterile gauze with the patient in the knee chest position was tried The result in a majority of cases was found to be that the uterus was in a favorable position when the abdomen was opened thus reducing the amount of intraperitoneal anesthesia necessary as well as the amount of discomfort to the patient thereby facilitating the carrying out of the intraperitoneal procedure

The method however presents advantages of almost equal importance when general anesthesia is used. In case the establishment of vaginal drainage may be anticipated the vagina should be thoroughly cleansed and the posterior vault snugly packed with sterile gauze (Fig 499 A). The preliminary vaginal pack should be firmly attached to a strong piece of cord or tape of sufficient length to reach a point well beyond the patient's feet. Thus an attendant in the operating room may without interfering with the aseptic technic withdraw the gauze from the vagina by making traction upon the tape. At the completion of the abdominal operation or when the appropriate time for the introduction of the vaginal drain has arrived the gauze which will present through the vaginal pelvic incision may be transfixed by a needle carrying a strong ligature (Fig 499 B) which has been carried through the distal or vaginal end of the proposed drain. After securely tying the ligature thus uniting the drain to the vaginal gauze (Fig 500 C) the latter is slowly withdrawn from the vagina by means of the tape thus carrying the vaginal drain into place (Fig 500 D). This method has the advantage over the time honored plan of having the assistant discommode the sterile drapes while he blindly introduces an instrument into the vagina during the operation for the purpose of grasping the drain and drawing it into place.

A SIMPLE METHOD OF ANCHORING THE IN LYING CATHETER IN THE MALE

The illustration (Fig 501 A) will show the application of the method. Silkworm gut is the most appropriate material to use. The catheter may be lightly transfixed by the ligature or the latter may be tied snugly around the catheter at the proper point. The ligature is then brought closely around the penis just proximal to the corona glandis. This method is simple, is non irritating to the patient, does not interfere with the proper cleansing of the parts and allows but slight variation in the position of the catheter. In case priapism is to be anticipated one may use a close fitting rubber band to encircle the penis (Fig 501 B).

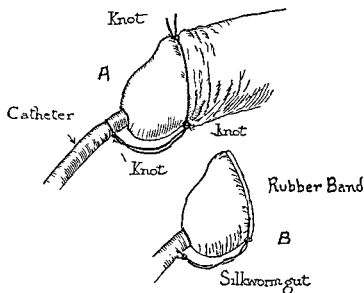


Fig 501 —Simple method of anchoring the indwelling catheter A Silk worm gut B Rubber band

AIR DILATATION OF THE BLADDER IN SUPRAPUBIC CYSTOSTOMY

It is the custom I believe with most surgeons to use fluid distention of the bladder as a preliminary to making a suprapubic incision into this organ. The viscus is more easily identified when distended. This method has a disagreeable sequel the spill which comes when the bladder is finally opened unless one uses the utmost care by means of suction or sponging in an effort to prevent it. When employing local anesthesia the conscious patient may be much disturbed and made very uncomfortable by this inadvertance.

We have for many years employed air dilatation of the bladder as a preliminary adjunct to opening this organ. Obviously the method cannot be used in case the urethral catheter cannot be inserted. The technic is most simple and is as follows. After passing the catheter the bladder is thoroughly irrigated and then completely emptied. A sterile towel is placed across the thighs beneath the penis. The catheter is anchored to this towel by means of a towel clip. An extension tube is then attached to the catheter and carried down between the patient's legs to the foot of the table at which point a pressure bulb is

connected and allowed to hang sufficiently low so that the drapes may not subsequently interfere with a view of it (Fig 502)

(If a suprapubic cystostomy only is to be made the draping may be carried out in the usual fashion and the operation may proceed. If however suprapubic prostatectomy is to be done at the same time the special method of draping described above is to be recommended (Fig 507 Insert)

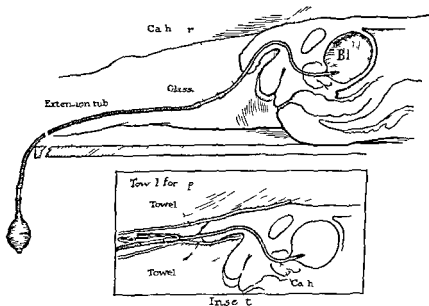


Fig 502—A diagram of the bladder catheter and extension tube with the pressure bulb. Insert Method of draping

After separation of the recti and pyramidalis muscles an attendant may dilate the bladder with air to any desired degree by means of the pressure bulb thus visualizing the bladder fundus and upon opening the bladder the air will escape and the spill will be avoided. Incidentally provided suction is not available the bladder mucosa will not be subjected to the traumatizing influence incident to the evacuation of this viscus by means of constant sponging.

POSTOPERATIVE HEMORRHAGE FOLLOWING SUPRAPUBIC
PROSTATECTOMY

It has been the writer's misfortune to have had 3 cases of postoperative hemorrhage following the performance of suprapubic prostatectomy. As his experience has not been extensive in the performance of this operation, being perhaps about equal to that of the average general surgeon, the number of postoperative hemorrhages here recorded brings the percentage too high for comfort, to say the least, and while 2 of these patients recovered, 1 died several days later from a septic pulmonary infarct, the etiology of which was probably directly associated with the hemorrhage in the relation of cause and effect. Even in the cases that recovered blood transfusions were required, and the secondary manipulations demanded by the emergency were most disconcerting to the surgeon, as well as a source of great discomfort and anguish to the patient.

In each of these cases the prostatic bed had been packed with two, three or four tapes of gauze, the ends of which had been allowed to extend through the suprapubic opening. The length of time after operation before the packs were removed differed in each case. The first hemorrhage occurred following the removal of packs forty-eight hours after the operation. Following this accident it became our custom to allow the packs to remain seventy-two hours. Our second hemorrhage resulted from their removal at the end of the third day, and this man, who was comparatively young and in splendid condition, died one week later as the result of a septic pneumonia of embolic origin, the autopsy showing the prostatic veins to be the seat of septic thrombosis. Following this it became our practice to allow the packs to remain ninety-six hours, and yet following this technic we experienced still another of these accidents. In each instance the following procedure was carried out in controlling the hemorrhage.

Method of Controlling Secondary Hemorrhage—The suprapubic incision is partially opened and a long malleable sound is passed per urethrum and its point brought out through the suprapubic incision. In some instances it may be necessary to

introduce a finger into the bladder in order to guide the tip of the sound to the surface. A strong fish cord is attached to the tip of the sound which is then withdrawn from the urethra. The suprapubic end of the cord is then threaded upon a sharp needle and by this means it is carried to and fro through a piece of gauze tape about 2 inches in width the needle piercing the gauze at about 2 inch interval. After the needle has passed through the gauze ten or twelve times the cord is securely anchored to the gauze at the suprapubic end. While traction is being made upon the urethral end of the string the end of the tape which was first traversed by the needle is gently guided through the suprapubic incision into the bladder. In this manner compression may be made upon the bleeding vessels. Following this we have anchored to the end of the urethral string a fine elastic band which in turn is attached to the foot of the bed for the purpose of making continuous elastic pressure upon the pack. In each instance the method has proved both simple and effective.

While appreciating the fact that the rubber bag may offer a more efficient means of controlling hemorrhage it so happened that no bag was available at the moment it was needed. The very fact that these accidents occur at comparatively long intervals makes it likely that such an apparatus as the rubber bag will be found to have deteriorated should there have been one on hand.

The simplicity with which packs of this variety—the plaited gauze pack—can be removed by the gradual method has led the writer to suggest a modification and the development of its use. The plaited gauze pack is not new and no originality is claimed for the method. However its simplicity the fact that its component parts are always at hand and its efficiency in action would seem to make its use worthy of more common application.

Like others we have found that the presence of an unprotected cord in the urethra is undesirable. Thus in the Urologic and Cutaneous Review 1917 I recommended the use of the plaited gauze pack following suprapubic prostatectomy the

gauze in this case being transfixed by a stout cord and carried through a rubber tube which protected the urethra. In no case in which this method of packing was used have we had postoperative hemorrhage as a complication. We have therefore reverted to the use of the platted gauze pack substituting for the cord a rubber urethral catheter.

The Gauze Catheter Pack (Fig 505)—The manner of applying this method is shown in the illustrations. In preparing for the operation it is well to so drape the patient that after the prostate has been removed one may have access to the external end of the urethral catheter without greatly disturbing the sterile drapes. For this reason the penis with its indwelling catheter is placed between two sterile towels (Fig 505 A and Fig 502). As soon as the prostate has been removed and the bleeding points ligated the urethral catheter (*e*) is advanced into the bladder and grasped by a hemostat and brought into the suprapubic opening a clamp having been previously placed upon its other end. Another catheter (*f*) of appropriate size is now passed to and fro through a 2 inch gauze tape. In order to facilitate this maneuver a sharp pair of artery forceps is used as a guide perforating the tape as the latter is placed upon it (Fig 503 B). By this means the catheter (*f*) may be quickly drawn through the perforations made by the forceps. The round or bladder end of catheter (*f*) should now be transfixed by a sharp needle and silk and the gauze tape securely anchored to it at a point 1 inch from its end (Fig 505 B and C). The other or external end of catheter (*f*) is now sutured to the bladder end of catheter (*e*). It will be readily seen that the withdrawal of catheter (*e*) will bring catheter (*f*) into the urethra and as traction is made upon it (Fig 503 C) the platted gauze will be forced snugly into the prostatic bed. From the inner end of this folded gauze the eye of the catheter will prevent. It is thus in most excellent position to afford drainage of the bladder and tension upon the outer end cannot fail to control hemorrhage (Fig 503 D).

Removal of the Pack—For the purpose of removing the pack traction may be made upon the suture which has been

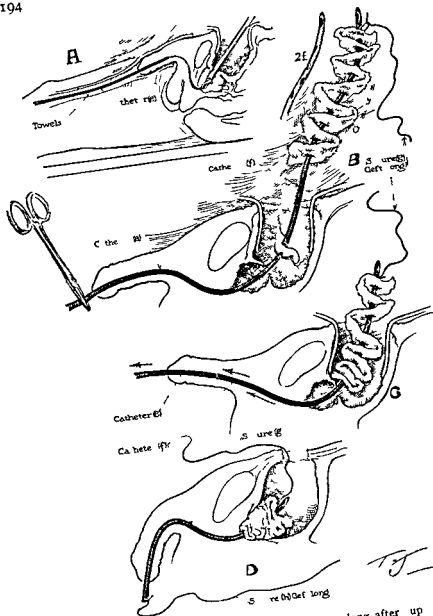


Fig 503—Plast d ga cath t m thod of pa long after up f
 pr t tect my A M th d f d p g B Pl t d ga -cath t r
 N t xt pe gs n cath t (2f) C P k b g nsert d a cat
 D P k n pla N t t g d h

left long and allowed to extend through the suprapubic opening (Fig 503 g) Before attempting its removal a string may be anchored to the external or penile end of the catheter (Fig 503 h) One may now by making traction upon the suprapubic string gradually withdraw the prostatic pack A number of days may be utilized in carrying out this maneuver if desired and one may have the satisfaction of knowing that he is in absolute control of the situation at all times The slightest evidence of hemorrhage may be met by making traction upon the penile end of the catheter or string As a rule the gauze seems to glide more freely along the catheter than along the string to which it sometimes becomes agglutinated thus preventing the unfolding of the gauze plaits

The catheter should be perforated at a number of points so that the drainage may not be interfered with when it is partially withdrawn (2f)

An especially desirable pack may be made by covering the gauze—an elongated diamond shaped piece—with rubber dam constructing what would amount to a wide flat Penrose drain which when inserted would give a spindle shaped pack

ASEPTIC EMPTYING OF THE DISTENDED BOWEL RUBBER TOWEL METHOD

In treating cases of acute intestinal obstruction one is often confronted with the necessity for emptying the distended bowel by means of an enterostomy In some cases it may be impossible to sufficiently empty the bowel through one opening alone and in certain instances the indications can only be met by opening the bowel at repeated levels in order to free this viscus from the toxic material which has accumulated within it—material which if allowed to remain may and frequently does act as a deciding factor in the progress of this extremely dangerous condition

The opening of the bowel always carries with it the possibility of resulting peritoneal sepsis The following method has been devised in an effort to meet the indications It possesses the merit of simplicity offers the surgeon the opportunity of efficiently emptying the bowel and in addition safeguards the

patient from the septic contamination of the peritoneal cavity to the fullest extent possible

The only equipment necessary in addition to that which is always at hand for operations of this nature is two or three sheets of sterile rubber dam of the approximate size of the average laparotomy towel

The rubber towel method of making temporary drainage of the intestine is as follows After isolating and carefully protecting the distended loop of gut by means of warm salt pads a purse string suture is introduced at a point opposite the mesenteric border The ends of the suture which should be of equal length are grasped in a pair of forceps while the mid point of the suture is secured in the same manner (Fig 504 A) By this means the intestine is controlled during the rest of the manipulation The table may now be tilted and the loop of gut displaced laterally so that the area through which the suture has been passed is made to assume a dependent position A rubber towel through which a short slit has been made is now placed between the surgeon and the protruding intestine and its lower edge allowed to hang well down over the corresponding side of the patient's abdomen (Fig 504 B) The assistant now feeds the ligature through the slit in the towel to the surgeon who in turn secures it by means of two pairs of forceps In this manner the loop of gut is delivered through the slit in the towel which in turn is drawn snugly over the bowel for a short distance The assistant with his hands beneath the towel may control and manipulate the bowel after the latter has been opened (Fig 504 B) Working on the other side of the towel the surgeon may then puncture the gut between the two limbs of the suture which most effectively retains the bowel in a dependent position as its contents are allowed to escape and flow down over the towel into a basin (Fig 504 B) A tube may be introduced and suction applied if desired However we have found the most effective means of emptying the bowel is to have the assistant go through the milking process When the bowel is thoroughly emptied the projecting knuckle may be quite completely cleansed by means of irrigation with hot normal saline solution

after which the purse string suture may be tied the ends cut short and the bowel withdrawn from the slit in the rubber towel

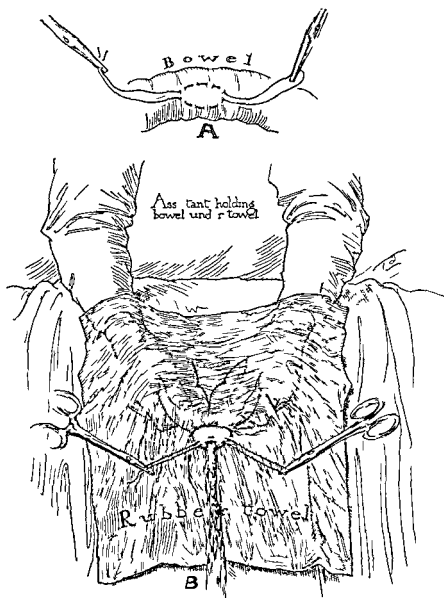


Fig 504—Aseptic method of emptying distended bowel rubber towel method A Method of placing suture in bowel B Bowel projecting through slit in rubber towel Bowl open Note assistant milking contents of bowel through enterotomy opening

as the latter is discarded This process may be repeated as often as desired thus evacuating the intestine of its toxic con

tents at various levels a fresh rubber towel being used each time

TEMPORARY SCREW FIXATION IN THE OPEN TREATMENT OF FRACTURES

Many ingenious devices and methods have been conceived for the immobilization of the fractured bone fragments after reduction by open operation has been accomplished. In the case of delayed or non union the bone graft inlay has no equal. The writer however has reference in this communication to the recent types of fracture—those in which some variety of fixation apparatus is indicated followed by closure of the wound.

Experience with the Lambotti and Parkhill methods led the writer to the conclusion that actual fixation of the internal type need not remain in place for a long period of time. Within a few days there is as a rule formed about the fragments a pabulum of putty like consistency which is sufficiently cohesive to prevent the broken ends from moving at least in a lateral direction. Angulation and shortening can be controlled quite effectively in the average case by external means. As a matter of fact once the tissues have set or become organized and the swelling has disappeared most fractures give little trouble to the surgeon provided a satisfactory reduction has been maintained up to that time.

Those considerations make it seem logical that some form of *efficient internal fixation which could be removed comparatively early after the operation* would be desirable. Success with the various methods in which the skin was pierced with pieces of metal encouraged us in the use of the plan outlined below.

The fracture having been exposed preferably by a curved incision and reduced skin punctures are made at appropriate points and the fragments which are held firmly in the corrected position are drilled for the introduction of the screws (Fig 505). Each screw is introduced immediately after the withdrawal of the drill and as many are used as seems desirable. The greatest rigidity is obtained by staggering the screw—that is directing them in different planes (Fig 505 A B and C). The screw holes

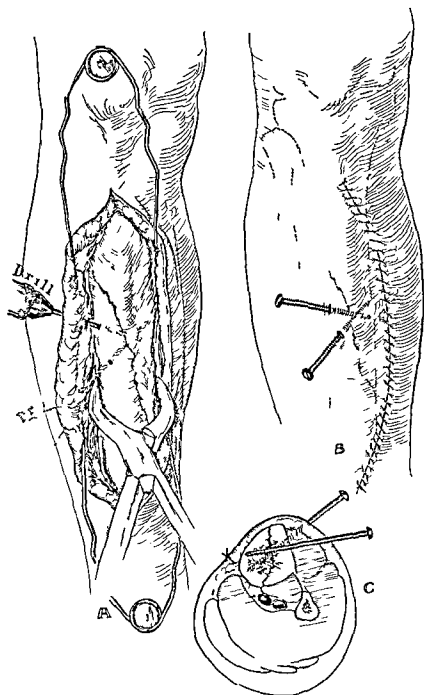


Fig 505—Temporary screw fixation of fractures A Fragments reduced and drilled B Screws in place wound closed C Sectional view

should be of slightly smaller diameter than the screws and the screws should be of sufficient length so that their heads will

project through the skin when in position. It is most desirable that the screws be introduced through the flap or at a distance from the incision (Fig 505 B and C).



Fig 506—Screw cast (unpadded) applied

The most convenient method of securing screws of sufficiently small diameter and yet of the requisite length is to purchase ordinary stove bolts and have the ends sharpened so that they may easily engage in the drill hole.

After closing the wound the limb may be immobilized by any method one may choose. We have used plaster of Paris

routinely. A copious dressing covers the projecting screw heads and as a matter of routine a window remains in the cast through which they may project.

The time for the removal of the screws has not been definitely established and indeed it is not an easy matter to ascertain. It is perfectly obvious that the sooner foreign bodies such as these are removed the better. We are removing them much earlier than we formerly did—one upon the eighth day with perfect satisfaction.

Our practice is to remove the original cast after all the swelling has subsided, availing ourselves of the offices of the screw fixation the while and apply a circular close fitting cast in its place. In some instances the cast has been applied without any padding whatever upon the vaselined skin.

The screws are allowed to project through a fenestrum in this cast as in the original one and may be removed when the surgeon's judgment dictates (Fig 506). It is my belief that after the second cast is applied the screws may be removed in any case in which there is but slight tendency for the fragments to become displaced.

CLINIC OF DR WILLIAM LERCHE

ST LUKE'S HOSPITAL ST PAUL

CARCINOMA OF THE HYPOPHARYNX AND UPPER END OF THE ESOPHAGUS

Female Aged Forty four Years Dysphagia Excision of Growth Patient Living and Well Four Years After Operation

FOLLOWING a cold in 1907 the patient had difficulty in swallowing solid food for a period of five years. At the end of that period she states the introduction of an esophageal bougie had given her complete relief and during the six years following deglutition was normal. In October 1918 she had an attack of influenza followed by dysphagia. The bougie treatment was tried without effect.

When the patient was referred to me in the latter part of March 1919 she could not take solid food and at times cold liquids would be regurgitated while hot liquids could be taken without difficulty. She noticed pain in her throat radiating to the region back of the right ear and a scratchy feeling in the throat irrespective of swallowing. She had lost 12 pounds in weight. There were no symptoms referable to the larynx.

A general physical examination was negative. On esophagosopic examination a growth was found on the anterior wall of the hypopharynx extending a short distance into the esophagus. A specimen of the growth was removed for examination and the pathologic report of Dr E. T. Bell of the University of Minnesota showed it to be carcinoma (Fig 507). The larynx was found normal. There was no palpable enlargement of the cervical lymph nodes. The patient was advised operation and she came for a preliminary gastrostomy on April 29 1919. A week later the operation for the removal of the growth was performed.

In view of the fact that the postcricoid carcinomata sometimes are superficial and do not invade the submucous tissue until late I planned to resect the upper end of the esophagus and excise the growth in the hypopharynx. If the growth should prove to have penetrated deeply I intended to resect the larynx the hypopharynx and the upper end of the esophagus. To this end a long and broad flap was cut with its base to the



F 507—Diagram of the dissection of the esophagus

right of the midline to be utilized for the plastic repair of the esophagus and hypopharynx or incidentally to cover after the resection of the larynx hypopharynx and the esophagus if such operation should be necessary.

After having exposed the esophagus on the left side the growth was readily felt through the anterior esophageal wall which was cut through well below the growth. The incision was

continued upward cutting the lower fibers of the inferior constrictor muscle. With retractors in place a good view of the hypopharynx was obtained (Fig. 508). The incision was continued around the growth at safe distance from it and it was

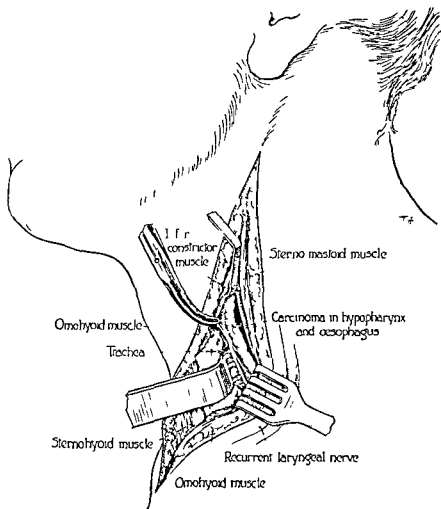


Fig. 508—Drawing of the field of the operation showing the hypopharynx and esophagus

found that the mucosa upon which the growth was situated could be peeled off as readily as the normal. The growth had evidently not extended beyond the mucosa neither in the hypopharynx nor in the esophagus. This discovery determined the subsequent steps in the operation. Instead of resecting the

esophagus and bringing in the flap a large rubber catheter (No 32 French) was introduced far into the esophagus through the left nasal fossa. The incision in the esophagus and the hypopharynx was closed with a few interrupted sutures leaving the large denuded area from where the growth was removed without any mucosal cover. The skin flap was partly sewed in its original place and the wound packed with iodoform gauze.

The patient made a good recovery. The large catheter through the nose into the esophagus was left *in situ* for two months. After its removal esophageal bougies increasing in



F 509—G specimen fifth carcinoma

size to No 42 French were introduced at first twice a week later at longer intervals. Esophagoscopy examination was made from time to time during the first year after the operation and as epithelization took place it had quite a normal appearance.

The patient is in very good health four years after the operation and has had no trouble whatever in swallowing any kind of food. She has regained her weight.

I would not make a preliminary gastrostomy in an operation of this type again because the feeding is well taken care of by the tube left in the esophagus.

The growth (Fig 509) was flat and of oval shape about 4.5 cm long 2.5 cm wide and 5 mm thick. It covered the anterior wall of the hypopharynx from a point about 7.5 mm from the upper border of the cricoid extending for more than 1 cm on the anterior wall of the esophagus (Fig 510)

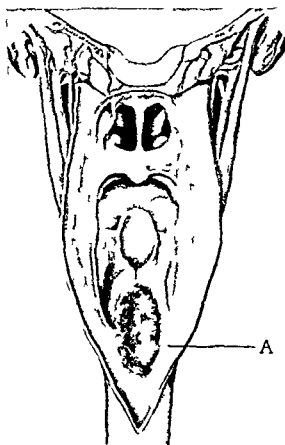


Fig 510—Showing the position of the growth on the anterior wall of the hypopharynx and the esophagus A

A number of cases of carcinoma of the hypopharynx have come under my observation but nearly all of them in such an advanced stage as to be inoperable. Most of the cases had been treated for some time by local applications for a supposed catarrh of the pharynx. One case had received such treatment for several months one year before I saw the patient. On the

other hand a case may present itself for the first time to the physician with a far advanced growth that has given rise to comparatively little disturbance

As mentioned above carcinoma of the hypopharynx is sometimes of slow growth and may remain superficial for a considerable length of time. In nearly all cases dysphagia occurs early however and if the patient complains of even slight disturbance of deglutition direct inspection of the hypopharynx and esophagus should be made immediately. If this was insisted upon and carried out early I believe that we would find a larger number of these cases in the operable stage. The esophagoscope is the instrument through which definite information can be gained in these cases. The extent of the growth downward should be determined when possible and a specimen removed for microscopic examination. The use of the x rays for diagnosis in this particular locality is of very little avail and the esophageal sound should not be used.

It is of interest to note that carcinoma of the hypopharynx is so much more frequent in women than in men. Of 141 cases collected from recent literature 122 cases occurred in women and 19 in men.

The reverse is the case with carcinoma of the esophagus. Some years ago I collected several thousand cases of carcinoma of the esophagus for statistical purposes.¹ An analysis of this material of clinical and postmortem cases showed that carcinoma of the esophagus occurred four times more frequently in men than in women.

The question why carcinoma of the hypopharynx occurs so much more frequently in women than in men remains a problematic one. There is one factor however that may have bearing on this question and on that of the etiology. I have had a number of cases of superficial ulcers of the hypopharynx and the upper end of the esophagus in women but have not seen them in men. I have also had several cases of membranous stricture in the hypopharynx and upper end of the esophagus exclusively in

women In some of the latter cases were seen a superficial ulceration at the stricture in the process of healing These membranous strictures are probably brought about in the healing process of the superficial ulcers

In the history of the case under discussion in this report there is a period of five years of difficulty in swallowing solid food several years prior to the onset of the carcinoma This dysphagia was promptly relieved by the introduction of a bougie I do not know of a pathologic condition in the esophagus that could be corrected by one treatment with the bougie except these thin membranous strictures

I have had several cases with such precancerous histories of dysphagia of many years duration and I should like to mention one because of her age

A young woman thirty two years of age had difficulty in swallowing solid food for eight years Then without any apparent cause the swallowing improved markedly and it remained better for four months when it again grew worse When she was referred to me two months later she could not swallow anything and she was fed by rectum

Upon examination carcinoma of the hypopharynx and esophagus involving the larynx was found My interpretation of this case is that during the eight years of dysphagia she probably had a membranous stricture brought about by the healing of a superficial ulcer of the hypopharynx At the site of the ulcer the carcinoma developed probably destroying the membranous stricture and thus giving the patient temporary relief in swallowing As her dysphagia began at the age of twenty four years it is likely that the original lesion producing the stricture had commenced a considerable length of time before that probably two or more years

I believe that these superficial ulcers quite frequent in women but rarely seen in men may be an important factor in the etiology of carcinoma of the hypopharynx and may also explain the frequency with which such growths occur in females as compared with males

LARGE CHRONIC ULCER OF THE ESOPHAGUS WITH STRICTURE AT THE SITE OF THE ULCER

Male, Aged Fifty five Years Dysphagia for Twenty Years
Deep seated Pain in Chest Radiating to the Back Stricture at
the Site of the Ulcer Dilatation of Stricture and Treatment of
Ulcer Through the Esophagoscope

C J R aged fifty five years Scarlatina at the age of
twelve years Gonorrhea Twenty years ago he first noticed
difficulty in swallowing while eating baked beans The beans
stuck in the lower part of the gullet until they finally were re-
gurgitated At first such attacks occurred every two or three
months gradually increasing in frequency During the last
twelve years the dysphagia has been continuous and he has
received treatment for stricture in a number of hospitals and
clinics in the East and Middle West At no time had esophag-
oscopy been made At the present time he can only take soft
food and liquids At times he cannot drink cold water Hot
liquids are readily swallowed He frequently regurgitates both
soft food and liquids and for that reason avoids eating in public
places He has been greatly troubled with deep seated pain in
the chest radiating to the back Physical examination revealed
nothing of importance Wassermann was negative

Upon the introduction of an esophageal sound obstruction
was met with at 34 cm from the incisor teeth

On esophagoscopic examination the organ above the stricture
was found dilated and contained a considerable quantity of
thick mucus At the junction of the middle and lower thirds the
entrance to the stricture came into view and was found lined
with a thick dirty white membrane The upper edge of this
membrane was detached here and there and underneath it
could be seen a raw surface (Fig 511) After the removal of
the membrane it was observed that a large ulcerated area

covered with bleeding granulations encircled the entire inner wall of the esophagus for a distance of 3 to 4 cm (Fig 512)

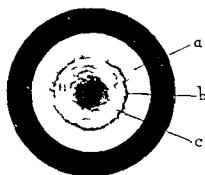


Fig 512—D w g f th lce c r d w th d ty wht m mb
a N mal pthel m f th esoph gus b gra l t g l c d ty wht
membra f l e

On fluoroscopic examination it was seen that even a thin barium mixture lingered for a considerable length of time above

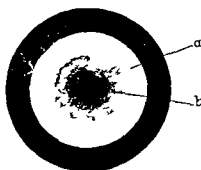


Fig 513—a N mal pthel m f th esoph g b l t d f t
th m val f th m mb

the contraction. The presence of quite a large dilatation was demonstrated above the stricture (Figs 513 514)

The thick membrane covering the ulcer added greatly to the narrowing of the lumen of the stricture

The etiology of this type of ulcer is somewhat obscure In 2 cases similar to the one under consideration here that have come under my observation the onset was preceded by supuration elsewhere in the body In one case empyema of the antrum of Highmore preceded the affection of the esophagus and in the other suppurative thrombophlebitis of the leg In



Fig. 513 —Rad iographic side view of the esophagus showing stricture at A

the latter case there was a history of having gulped up pus and blood on two occasions in the early stage of the dysphagia It is entirely possible therefore that abscess in the mucosa of the esophagus with destruction of the epithelial cover may be the origin of the ulcer

Treatment —The stricture was first dilated to No. 46 French in order to get a clear view of the extent of the ulceration In the same sitting the esophagoscope was introduced and after having removed the remnants of the membrane the ulcer was

treated by the application of nitrate of silver in 20 per cent solution. At times I use strong tincture of iodine. The treatment is repeated once or twice a week.

In other cases like this that I have treated epithelization has taken place and I expect equally good results in this case. The patient now can eat any kind of food without difficulty.

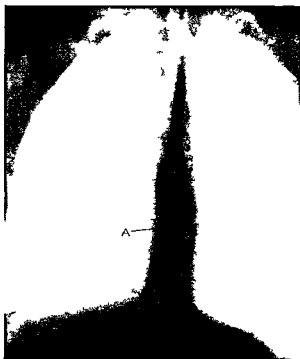


Fig 514—Rad g ph f nt v w f th ph g w th k b r m
m xt Stri t t A

If epithelization should not take place the stricture would soon contract again and the patient would have to use a bougie twice a week for the rest of his life in order to be able to get his food down with any degree of comfort. If the bougie treatment is properly carried out over a long period of time after epithelization has taken place a permanent cure may be expected. However in all cases of stricture of the esophagus after the

regular course of treatment has ceased the organ should occasionally be examined through the esophago cope, and a full sized bougie introduced. By properly carried out bougie treatment I mean that a full sized bougie *i. e.* a cylindric flexible instrument and not an olive shaped, is introduced through the stricture and left *in situ* as long as the patient can stand it, that is ten fifteen or twenty minutes. In other words a stricture of the esophagus should be treated on the same surgical principles as a stricture of the urethra.

MULTIPLE STRICTURES OF THE ESOPHAGUS AND HOUR-GLASS STOMACH FOLLOWING LYE POISONING

Male Aged Fifty Years Swallowed Lye by Accident at the Age of Forty eight Years Four Strictures of the Esophagus, Treated by Multiple Incisions Through the Esophagoscope Followed by Dilatation Well For Fourteen Years in Spite of Neglect of After treatment, Then Recurrence of Strictures of the Esophagus and, in Addition, a Stricture of the Stomach

H C G aged fifty years came to me in 1908 with the history that he two years previously by mistake had taken a swallow of a strong solution of lye He had had a hearty meal immediately preceding the accident and vomited promptly after drinking the lye solution He thereupon took a wineglassful of vinegar by the order of his physician About two weeks later the patient noticed difficulty in swallowing solid food and he regurgitated food and thick mucus For the two years following bougies had been introduced once or twice a week He could not take solid food during this period and his diet consisted of eggs milk and soups At times he had difficulty in swallowing liquids A general examination of the patient was negative Upon the introduction of an esophageal sound obstruction was met with at 27 cm from the incisor teeth

On esophagoscopic examination the organ above the stricture was found dilated and contained a quantity of thick mucus The entrance of the stricture was seen to the left of the center and appeared like a funnel flattened from side to side Besides the stricture at 27 cm there were others found at 34 at 37 and at 41 cm from the incisor teeth No radiographs were taken but I made a sketch at the time of the strictures as I saw them through the esophagoscope (Fig 51b) The strictures were tough and unyielding but by making multiple incisions

into each one followed by dilatation I gradually succeeded in restoring the lumen of the esophagus so that finally bougie No 45 French scale could be introduced without difficulty. The patient received regular biweekly treatments by bougie

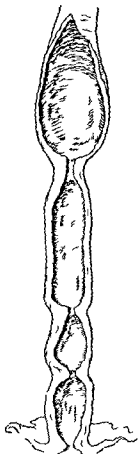


Fig 515 —Sketch of the patient's esophagus made in 1908 from the impressions gained through the esophagoscope.

for some time. When discharged he could swallow any kind of food. He was instructed to have a full sized bougie introduced once a month and later at longer intervals. I am positive that during the two years of bougie treatment the patient had

following the accident the bougie at no time could have advanced beyond the first stricture and in all probability not even through the first

I did not see the patient again for fourteen years. He returned in January 1923 having been remarkably well until

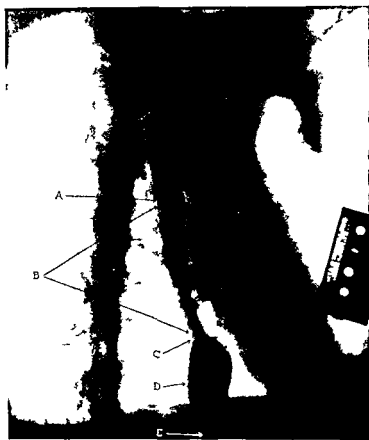


Fig 516—Stricture at *A* and above this large dilatation *B* showing the irregular gradually narrowed esophagus. Stricture at *C*. Dilatation at *D*. Stricture near cardia at *E*.

the early part of 1922 in spite of the fact that he had absolutely neglected my instructions as to the after treatment. Although he could eat solid food up to December 1922 it had to be very well masticated and liquids if too hot or too cold gave him great trouble. After an attack of influenza in December 1922 he could take no solid food it hurt to swallow liquids and he

had frequent spasms of the esophagus epigastric pain sour stomach gas and regurgitation

Examination with the esophageal sound revealed an obstruction at 31 cm from the incisor teeth On esophagoscopic examination was found some narrowing of the cervical part of the esophagus and considerable dilatation in the upper thoracic portion above the stricture at 31 cm



Fig 517—St et t ppe d m d l t h d f t h t m a h d t l y e

Fluoroscopy and radiographs showed dilatation in the upper thoracic part the stricture at 31 cm and a gradual irregular narrowing of the esophagus to about 5 cm above the diaphragm where the narrowest stricture was found (Fig 516) There was also a constriction below this near the cardia At the juncture of the upper and middle thirds of the stomach a pronounced constriction was observed dividing the organ into two distinct compartments the so called hour glass stomach (Fig 517)

Treatment—The strictures of the esophagus were treated by introducing bougies in increasing sizes to No 43 French. The strictures yielded quite readily to the treatment and were not by far as difficult to overcome as the original ones fourteen years previous. After this treatment the patient could take solid food but he still had considerable pain. I then passed the bougie (No 42 French) through the stricture in the stomach twice (Fig 518) and after the last treatment the patient reported that the pain had practically left him and he felt very much better. On March 19th I opened his abdomen with the expecta-



Fig 518 —Shows the flexible steel dilator in the stricture of the stomach

tion either to resect the constricted part or to make a gastroenterostomy on the proximal pouch. An annular stricture was found which like a string encircled the stomach and through which I could push two fingers. I made an incision through the stomach wall about 6 cm long across the stricture in the long axis of the organ and sewed the cut surfaces together in the short axis thereby making the passage considerably larger. This in all probability will serve him as well as a gastroenterostomy.

The great majority of strictures caused by lye can be treated successfully by the use of bougies. There are cases however

that do not yield to this treatment and for this type of strictures
I devised (in 1907) the method of multiple incisions. This

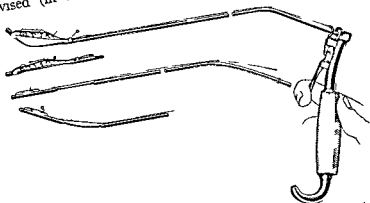


Fig 519—An esophagoscope for adult patients. H. M. L. v. a. n. F.
E. ph. gotom. f. h. l. d. n. G. n. t. o. n.

operation is performed through the esophagoscope under the
guidance of the eye. In Fig 519 I show the esophagotomes
that I devised for this purpose.

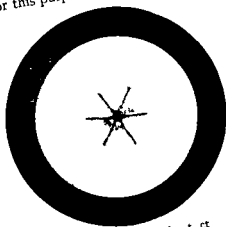


Fig 520—Showing multiple incisions in the stricture of the esophagus.
After the incisions are made (Fig 520) the dilator (Fig 521)
is introduced into the stricture and the first dilation is

under the guidance of the eye In subsequent sittings the dilatation is carried out by the use of bougies (Fig 522) I

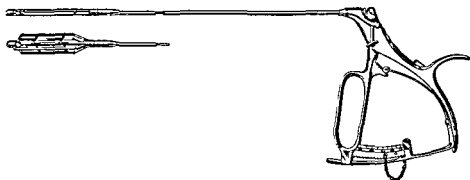


Fig 521 —Author's esophageal dilator

always introduce the bougie on a guide which consists of a long piano wire with a small olive shaped metal tip in the distal end

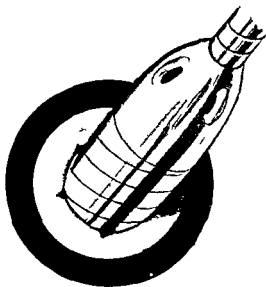


Fig 522 —Illustrates the yielding of a resistant structure after multiple incisions

(Fig 523) On this wire is threaded a long slender and flexible steel bougie with which it is pushed through the curved metal tube and through the esophagus into the stomach The slender

steel bougie is then withdrawn leaving the guide in place and upon the latter the larger bougie is introduced as in Fig 524 In most cases I succeed in passing the guide into the stomach by this method If it fails I try the thread method letting the patient swallow 5 yards of stout silk thread as suggested by Mixter I never depend upon the silk thread as a guide for the

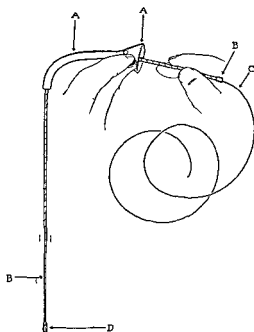


Fig 523—G d (C D) with l d t l bo g (B B) b g p d th b
th d m t l t b (1 4)

bougie however for the reason that if it is pulled upon fairly tight it may cut the mucosa somewhere in its course and if it is not pulled fairly tight the bougie may do damage On the other hand it is a very excellent method for leading the wire guide into the stomach (Fig 525) and for this purpose I have used it for many years Occasionally I meet case in which

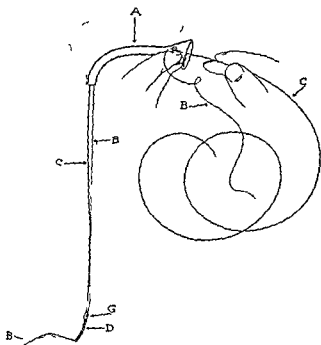


Fig 525—The introduction of the tube with the reflexible tip. Do the silk thread B B B through the curved tube A

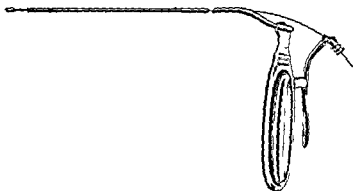


Fig 526—Gastroscopy performed through the nasopharynx

DIVERTICULUM OF THE ESOPHAGUS AND LARGE INTRA THORACIC GOITER

Adult Male Dysphagia for Many Years Removal of Intrathoracic Portion and Resection of Right and Left Lobe Invagination of the Diverticulum Cure

P. S. aged sixty three years had noticed great enlargement of both sides of the neck especially the right for eighteen years

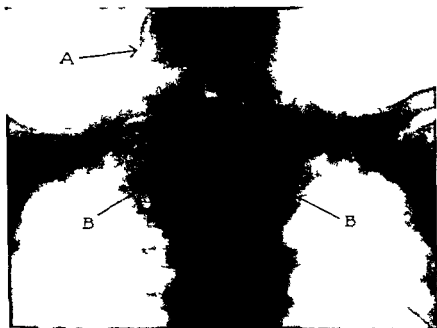


Fig 5 —Radio-graph showing a diverticulum of the esophagus (A) and large intrathoracic goiter (B B)

and had increasing difficulty in swallowing. If he tried to drink in the ordinary way he got a choking spell and regurgitated. Dry food troubled him very much. He could not sleep on either side but slept quite comfortably on his back.

On examination his heart action was rather rapid there was

some dilatation of the heart The lungs were negative Hypertension

In esophagoscopic examination the right lobe of the thyroid was found encroaching upon the esophagus and there was considerable resistance to the introduction of the esophagoscope

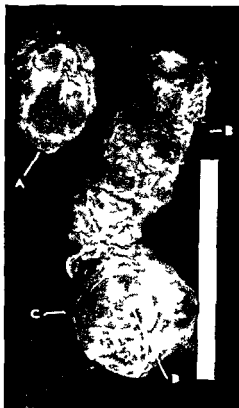


Fig 528—Photograph of specimen A Left lobe B Right lobe C Anterior view of glandular tissue D Dissected glandular tissue showing internal structure

The obstruction was on the right side and also posteriorly to the right so that the instrument had to be directed toward the left in order to get by A small diverticulum was also observed

Radiography A large shadow was seen in the mediastinum and diagnosed an intrathoracic goiter The esophagoscopic

finding of a diverticulum was demonstrated after a barium meal (Fig 521)

The patient had much more disturbance of deglutition than we ordinarily find with a diverticulum of this size and the pressure of the goiter was responsible for this

At operation under ether the large intrathoracic part of the goiter (Fig 528) which was continuous with the right lobe was removed together with the larger part of the right lobe and a part of the left

The pressure on the esophagus caused by the right lobe posteriorly and laterally was demonstrated at the operation

The patient improved much after the operation but he still had some difficulty in swallowing At a later date the diverticulum of the esophagus was invaginated and obliterated by rows of purse string sutures

CLINIC OF DR FRED L ADAIR

MINNEAPOLIS GENERAL HOSPITAL

CARCINOMA OF THE UTERUS

A CONSIDERATION of cancer is always important not because we have such absolute knowledge regarding its etiology or cure but because it is such a terrible disease and its early recognition offers the only possibility of cure

A great deal is being done by means of propaganda and education in an effort to bring in the cases earlier in the development of the disease so that we may have a better opportunity of securing a larger percentage of relative and permanent cures. There are probably three main objectives in this educational propaganda regarding cancer

- 1 Education of the public to some of the early symptoms of the disease
- 2 Education of the medical profession to recognize the disease when possible sufferers present themselves
- 3 Probably the most important to increase our knowledge regarding the etiology and method of cure of the disease

The uterus is one of the most frequent organs to be affected with cancer and carcinoma of this organ together with that of the breast make up the vast bulk of cancer cases in women

The educational campaign is not yielding results which are at all encouraging if one is to judge by the cases of uterine cancer which come into our hands in the Minneapolis General Hospital

Statistics from the Minneapolis General Hospital—In the seven years from 1916 to 1922 we have not had a large series of cases at the Minneapolis General Hospital—90 in all appearing in our series. So far as race is concerned we had relatively few cases occurring among colored people only 4 of our cases

case of uterine carcinoma the etiology and prevention of the disease always come to mind. The paucity of knowledge regarding these factors in the eradication and treatment of this disease is continually emphasized in one's mind because methods of cure are so unsatisfactory. Etiology has been carefully studied for many years and this work and study has not yielded the specific results which one would desire. The most interesting recent work is that of Yamagawa and Ichikawa who have been successful in producing the so called "tr" tumors by the continued external reapplication of coal tar. They were the first to be successful in the production of this lesion on the rabbit's ear by continued reapplication of coal tar.

Fibiger inaugurated quite an extensive experimental study of cancer by feeding rats with cockroaches having larval nematodes. These rats developed squamous cell carcinoma of the tongue and stomach in varying percentages. Similar results have been obtained by feeding rats with *Tænia crassicolis* producing carcinoma of the liver.

The occurrence of occupational cancer in tar workers, paraffin workers, chimney sweeps, x-ray workers, arsenic workers, all points to the role of persistent irritation as an etiologic factor in the causation of cancer. It is quite probable therefore that there may be no specific cause of cancer, that certain individuals are especially susceptible to the occurrence of irregular and uncontrolled cell proliferation which may result from a persistent irritation at different sites and in different organs of the human body.

If chronic irritation is the cause of cancer, it is quite conceivable how certain forms of cancer should increase while perhaps the total number of cancer cases would not be materially greater.

Changes in industry, methods of work, habits of the population, diet, etc., might easily tend to increase certain types of cancer while perhaps other forms would tend to disappear.

How can the theory of chronic irritation be applied to the development of uterine cancer? It is quite easy to comprehend how cancer of the uterine cervix could develop as a result of

persistent irritation. It is not quite so easy to account for cancer of the corpus uteri. Cancer of the uterine cervix is apparently more frequent in women who have borne children. We can have in this portion of the uterus chronic irritation as a result of erosions of the cervix and persistent inflammatory conditions. There is no reason why persistent bacteriologic as well as chemical irritation could not be a factor in the production of carcinoma. Case I cited below suggests the possibility that the treatment of the erosion may have been a factor in the production of the subsequent carcinoma. In this case the piece of tissue removed in March 1919 was non malignant whereas a portion removed one year later showed a malignancy of the squamous cell type. During the interval she had received treatment more or less persistently for this erosion of the cervix. Treatment consisted of repeated applications of both silver nitrate and pyrologneous acid.

It is particularly easy to understand why these erosions of the cervix with persistent irritating leukorrheal discharges might become the site of carcinoma. Within the cervical canal we also have pathologic changes occurring which though not visible to the eye are none the less real. We have here persistent inflammatory reactions which might well lead to the ultimate production of carcinoma of the cervix. Carcinoma of the uterine body occurs more commonly in nulliparous women. We may here have certain persistent irritations due to various pathologic conditions inflammatory conditions of the uterus and tubes and neoplasm such as fibroids which may be a factor in the production of carcinoma in this location.

What can be done in methods of prevention? What course is one justified in pursuing based on our present knowledge of the etiology of cancer? The prophylaxis of cancer does not at the present time rest on a very secure scientific foundation especially when affecting the uterus. What procedure if any should one use in an effort to prevent the occurrence of carcinoma? One would seem to be justified in advising the removal of chronically and persistently inflamed and irritated tissue from the uterine cervix. This does not necessarily mean that

all lesions of the cervix should be subjected to operative procedure whenever they are found. It does mean that when one discovers a lacerated cervix with a persistent erosion and an irritating leukorrheal discharge that repair of such a cervix by methods which would remove this irritation would be justified and might be the means of preventing the occurrence of carcinoma of the cervix in such a case. Also in cases with markedly cystic cervixes with chronic persistent endocervicitis one would be justified in the use of operative procedures for the removal of the diseased tissue. At the present time it is not apparent how prophylactic measures can be applied to the development of carcinoma of the corpus.

We can divide the patients with advanced carcinoma who come under observation into two groups:

- 1 Those who ignore the early symptoms and seek no advice until the disease has spread beyond all possible cure.

- 2 Those who observe the early symptoms seek medical advice and the disease is not recognized in its early stages by their medical advisor.

If the educational campaign against cancer is to be successful it must reach the laity and impress upon them the importance of seeking medical advice at the onset of suspicious symptoms. Further it must impress on the medical profession the necessity of positive evaluation of early symptoms and signs in the recognition of this disease. The trouble with the education of the medical profession in the past has been that medical men have been taught to diagnose carcinoma by the late rather than the early symptoms of the disease. It is of little benefit to the patient to diagnose carcinoma after the patient is affected with a so-called cachexia, loss of weight, hemorrhage and foul discharge. These are all late and not early symptoms of uterine cancer. The one important early symptom of uterine cancer is slight bleeding from insignificant or without apparent causes. This may occur as a slight intermenstrual bleeding which may or may not follow slight trauma. It may occur as prolongation or increased frequency of the menstrual periods or a shortened interval between periods. In many it appears as a more profuse

or prolonged menstrual flow Both lay and profession should be educated to appreciate the significance of these symptoms occurring any time after twenty five years of age Lay people should consult medical advisors on the first appearance of these symptoms It is the duty of the medical profession to determine the cause of the e symptoms In the majority of cases it will probably not be carcinoma but the only way this can be determined is by careful examination of all cases presenting these symptoms There are many pathologic varieties of cancer of the uterus From a clinical point of view it is better to group the cases according to the location of the initial growth rather than from the morphologic character of it I am speaking now of early cases of cancer of the uterus In advanced cases the origin of the growth is difficult or impossible to determine

The Treatment of Carcinoma—Treatment of carcinoma of the uterus will be divided into two main heads

1 Palliative for the relief of symptoms and prolongation of life

2 Curative when we strive either for a relative or an absolute cure in an effort to prolong or save the life of the individual

In the main these methods of treatment consist in the application of

1 *Chemical or thermic agents*

2 *Radio active substances* such as γ rays and radium

3 *Surgical procedures*

These different methods of treatment will be considered somewhat in detail

Palliative or symptomatic treatment This consists mainly of measures used to relieve pain hemorrhage and discharge with the added indication of prolonging life

Chemical Agents—Of the chemical agents used for this purpose acetone is probably one of the most important being applied directly to the carcinomatous growth with or without excision of as much of the growth as possible In the use of this therapeutic agent great care should be exercised The surrounding normal tissues should be thoroughly coated with vaselin and the acetone applied directly to the diseased tissues

All excess of the agent should be carefully removed following this application

Thermic Agents—Of the thermic agents the actual cautery or electrocautery is one of the most valuable and is probably one of the best agents and sometimes it results in permanent cures. In the use of this agent one excises the diseased tissue as completely as possible and then applies heat directly to the remaining diseased tissue as thoroughly as possible according to the old method of Byrne. The heat can be more carefully controlled by the method of Percy using a water cooled speculum and control of the amount of heat used by means of the abdominal incision with the hand or fingers in and around the uterus so that no excessive heat is applied. Neither one of these agencies and methods can be regarded as anything more than palliative though occasional cures have resulted. Certain procedures are both palliative and curative. These include x ray radium and various surgical procedures. In the present method of treatment of cancer not infrequently all three of these methods are used in an attempt to affect a cure.

x Rays—It is too early yet to properly evaluate the results obtained from the new and powerful therapeutic x ray apparatus which is now being used. It may however safely be said that at the present time this method should not be used to the exclusion of surgical procedures where the latter are available. x Rays may be used in inoperable cases.

The place of radium is somewhat more definitely established though its ultimate relationship to operative procedure is not as yet finally determined. At present radium should be recognized as a very valuable adjunct to surgical procedure. It gives very great symptomatic relief and undoubtedly prolongs many lives even though not affecting permanent cures. In borderline and in inoperable cases where operation is not feasible or safe radium should be used. It probably gives the best results when used in conjunction with the deep x ray therapy. Palliative surgical procedures may be used in conjunction with radium. There is a considerable tendency to advocate the use of radium to the exclusion of surgical procedures. While we do

not know what the ultimate standing of radium will be and though it may ultimately prove to yield a larger percentage of cures than radical operation we have at the present time in sufficient proof to draw this conclusion. In operable cases of carcinoma we can secure 25 or 30 per cent of permanent cures with a still larger number of relative cures. We have no proof that radium can accomplish as favorable results. Such proof may be forthcoming at a later date.

Further it is important to remember that the use of surgical treatment does not eliminate the possibility of using radium and x ray either pre or postoperatively or both. At the present time it would seem that the best procedure might be to use radium prior to operation perform the operation and then subsequently resort to the use of either radium or deep x ray therapy in all operated cases where indicated. In borderline and inoperable cases radical operation should not be attempted the chief reliance being placed on radium and deep x ray therapy supplemented by palliative surgical procedure. The above remarks apply particularly to cases of carcinoma of the cervix. The results of surgery in carcinoma of the corpus uteri are much more encouraging than the results obtained in the former group of cases. Carcinoma of the corpus should always be treated surgically if the case is operable. It is probably wise to supplement the surgical procedure by the use of either radium or deep x ray or both.

The three sites of the initial development which one must keep in mind are as follows:

- 1 On the *vaginal portio* near the external os
- 2 Within the *cervical canal*
- 3 In the *corpus of the uterus*

Each of these different classes will be considered separately with illustrative cases.

1 We will consider the first group which is as a general thing the most readily diagnosed because it can be inspected by the use of a vaginal speculum. On palpation we usually feel a localized area of hardening on the cervix slightly elevated or depressed or with a depressed center and a somewhat elevated

margin. On inspection we see an eroded or more commonly an ulcerated area on the cervix. The difference between erosion and an ulceration is that in an erosion we have simply loss of epithelium whereas in ulceration we have some actual destruction of tissue. Where ulceration is present on the vaginal portion one thinks of three conditions—tuberculosis, syphilis and carcinoma. Any localized or ulcerated area on the cervix which seems somewhat hard to the touch and bleeds easily on contact should always excite one's suspicion of a carcinoma. It may be necessary to make a diagnostic excision in order to make a final diagnosis. One should never hesitate to perform this trivial operation in any suspicious case. In this connection I should like to cite the following cases:

Case I—Mrs. J. C. Seen in consultation with Dr. C. O. Maland. Married twenty-eight years. Age fifty-one years. Pregnant six times. Two full term pregnancies. Family history unimportant. Previous history: Measles, mumps and some rheumatic disturbance. General health has always been good. Weight about stationary. Menstruation established at about eighteen or nineteen years; intervals about four weeks. Has not menstruated for past six or seven years. Has been wearing a pessary for some time.

First came under observation on March 2, 1919, complained of some soreness in the pelvis which she located in the uterus. This began about two months ago. She has noticed some purulent and bloody vaginal discharge. She had what she calls some falling of the womb. She has had no trouble with her bladder but complains of some bearing down sensation in the abdomen.

Examination shows multiparous external genitalia. Perineum fairly competent. Has anterior colpocele. Cervix shows some ulceration on the anterior lip. Bilateral laceration of the cervix. Normal mobility; points downward and backward. Corpus shows some retroversion; freely movable; not easily outlined. Palpation unsatisfactory on account of muscular resistance; no adnexal pathology could be felt. The cervix was treated for about two weeks when a piece was removed for microscopic

examination This examination of the tissue showed no evidence of malignancy The patient continued under observation with some local treatment of erosion until February 26 1920 The cervix bled readily on contact the area of ulceration seemed to have increased in size The tissue removed for microscopic examination showed the presence of a squamous-cell carcinoma The patient felt very well had lost no weight general condition was good The symptom continued about the same as before On March 20 1920 a radical abdominal operation was done with complete removal of the uterus and adnexa The patient refused to have radium treatment After the operation her general condition improved and there has been no evidence of any recurrence to date

Case II—Mr. A. E. C. Patient came under observation for existing condition on October 18 1921 She had previously been under care during one pregnancy on account of hyperemesis for which it was necessary to perform a therapeutic abortion She was thirty-four years old had been married between six and seven years She had three pregnancies two of which were full term

Previous History—She had cirrhosis of the liver which was discovered at an operation for appendectomy when the omentum was sutured to the liver The patient also gave a history of lues acquired eight or nine years before for which she had been under treatment about two years She complains of irregular menstruation at intervals of seven or twelve days which began about six weeks ago Prior to this menstruation had been every twenty-eight days lasting five days About six or seven weeks ago her period came a week early and lasted longer than usual she passed some clots of blood which was unusual She also had some nausea during the week of September 5th She thought she might be pregnant On the day that she came for examination she was flowing quite profusely She had been up and around and quite active physically Her general health had been quite good

Examination how normal multiparous external genitalia

and some bloody discharge from the vagina. Cervix seems rather indurated, shows a rather large erosion or ulceration which bleeds rather easily. The corpus uteri is small and in good anterior position. There is a slight tenderness in the adnexal region but no palpable masses.

A small piece of tissue was removed for microscopic examination. A diagnosis of carcinoma was made. She was sent to the hospital for immediate radical operation. On October 20th

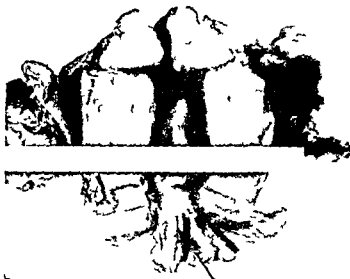


Fig. 529.—Case II. Photograph of the external type of lesion. Shows a small ulcerated area of the vaginal port.

50 mg. of radium were inserted into the cervical canal. It was left for about twenty-four hours when it was removed and a radical operation for carcinoma of the cervix was done. The patient made a fairly good recovery. Subsequent to the operation she developed a continued watery discharge from the vagina which resulted from some injury to or necrosis of the left ureter. It was necessary subsequently to remove the left kidney on account of pyonephrosis. The patient has remained

carcinoma. Microscopic examination of the specimen showed the presence of a squamous cell carcinoma of the cervix uteri.

The Second Group, Carcinoma Within the Cervical Canal—Inspection is here of little value. Palpation with the finger is of no value. In all examinations of these cases either a uterine sound or a cotton wound applicator should be introduced within the cervical canal up to the margin of the internal os, and if one feels a roughened, perhaps a slightly depressed surface

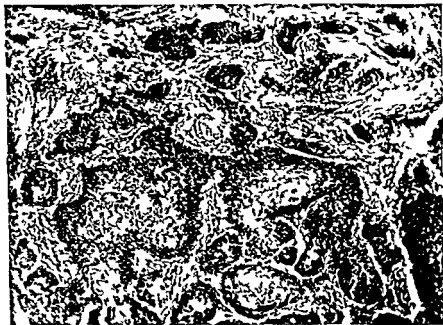


Fig. 530.—Case II. Photomicrograph through ulcerated area showing islands of epithelial cells invading the cervical tissue. Squamous-cell carcinoma arising from vaginal portio.

which bleeds easily, it is very good evidence of carcinoma in the cervical canal. One cannot inspect these cases except possibly with a uteroscope, which has not been a very satisfactory means of diagnosis. In these cases we must finally rely on microscopic examination of tissue removed with a small curet. This biopsy can readily be done even without anesthesia, and small fragments of tissue removed from the roughened or depressed area will establish the diagnosis. In this connection I wish to cite the following cases:

Case III—Mrs E W Aged thirty three years Married
Patient now complains of

- 1 Brownish foul smelling discharge
- 2 Spotting between periods
- 3 Slight pain in both lower quadrants of abdomen
- 4 Urgency and frequency of urination



Fig 531—*Case III* Photograph of tumor removed to patient's home
care; mass grown with the cervical canal

Past History—Housewife She had gonorrhea when she was eighteen years old a syphilitic infection for which she has received two or three years of treatment She has been married twice Patient had one illegitimate child forceps delivery puerperium uneventful No other pregnancies She was in an automobile accident received a fractured skull seven years ago As a result of this she lost her sense of smell She has had scarlet fever measles chickenpox Her general health

has always been good. She had an operation about one year ago when the uterine tubes were removed together with a piece of the left ovary. She made a good recovery from the operation.

The last two months patient has been working hard at day work and she has noticed considerable backache the last few weeks but she ascribes this to her hard work. She has had some light attacks of pain in the lower abdomen since her operation.



Fig 337.—Case III. Photomicrograph shows growth of epithelial columns from ulcerated surface. Considerable leukocytic infiltration around epithelial masses. Squamous-cell carcinoma.

About a month ago she noticed a vaginal discharge. She has been told that this has a bad odor. She has been spotting between periods for the past month. At first this was only a trace of blood but for the last couple of weeks she has been using two napkins daily because of the increased amount of bleeding.

Menstruation was established at sixteen. This is of the regular twenty-eight-day type lasting from five to six days of

bright red color At times she passes a few clots She has some pain with her menstruation for the first two or three day These pains are of a cramp like character Her last period which was normal began on February 3rd Patient came under observation on February 16 1923

Bimanual examination showed a competent perineum with fairly normal multiparous external genitalia Vaginal walls were of normal color There were a few hard nodules in the anterior wall The cervix was enlarged There was a bilateral laceration with some eversion of both lips The os was irregular in shape and the surrounding portio nodular in character There seemed to be some loss of tissue on the posterior lip The corpus is about normal in size the first degree retroversion Normal symmetry freely movable and not tender The cervix showed an erosion on the portio which did not bleed very readily Within the cervical canal there was a roughened area which bled easily on contact A portion of tissue was removed from the cervical canal the microscopic examination of which showed a squamous cell carcinoma

The patient was operated on February 21st The abdomen was opened in the midline There were numerous adhesions to the parietal peritoneum The right uterine tube was found not to have been removed It was markedly bulbous tortuous and chronically inflamed The right ovary was slightly cystic A portion of the left tube was present The left ovary had been removed There were some old adhesions around the uterine tubes and ovaries There was no evidence of metastases in the cervical lymph nodes

A panhysterectomy was done with removal of as much of the parametrial tissue as possible This was rendered more difficult because of the long standing inflammatory condition in the pelvic tissues

The ureters were identified The uterus the remainder of the tubes and the ovaries with the parametrial tissue the cervix and the upper portion of the vagina were removed *in toto* Rubber drainage tubes were placed in the parametrial tissue and carried down into the vagina The peritoneum was united over

the drainage tubes the vaginal opening was closed together with the peritoneal covering

The drainage tubes were removed on the third day. The patient made an uneventful recovery and was discharged from the hospital in excellent condition on March 8th 1923

Case IV—Mrs A S Aged forty three years Married

Present Complaint—1 Irregular and profuse bleeding from the vagina for about three months

2 Some yellowish white vaginal discharge without odor

3 Pain radiating from the left hip into the leg

Past History—Has been married for thirteen years Has had no children Eight years ago had an operation presumably for the removal of fibroids Menstruation began at the age of sixteen twenty eight day type lasting from three to five days She is uncertain about the date of last period

In June and July 1922 she missed her periods She had a normal period in August but none in September About two weeks later she began to bleed fresh blood This bleeding continued for about two weeks Since then there has been irregular bleeding at intervals of one or two weeks For about five weeks she has noticed some yellowish white vaginal discharge which has no noticeable odor Has lost some strength the past few months She consulted a physician about six months ago and has seen him at various times since She recently went to another physician who told her that she had a growth on the neck of the womb and advised her to go to the hospital

Bimanual examination shows external genitalia quite normal Vaginal walls normal Cervix uteri very large about 4 or 5 cm in diameter Both lips are somewhat irregular in contour Corpus uteri rather small firm retroverted and fixed There is considerable induration in both parametria Inspection of cervix Cervix is large irregular in outline is markedly reddened Cervix is quite tender on palpation This hypertrophy of cervix is quite hard and indurated and bleeds easily on contact

Microscopic examination of a piece of tissue removed from the cervix reveals a squamous cell carcinoma.

On January 24, 1923, 50 mg. of radium were inserted into the cervical canal. This was removed prior to operation on January 27th, having been inadvertently left *in situ* and giving an unduly long exposure.



Fig. 533—Case IV. Photograph of the removed specimen. The lower portion of the cervix almost completely infiltrated with carcinoma cells. The point of greatest growth is the lower vaginal portion with the lower part of the cervix. It is probably the latter. There are multiple fibromyomatous nodules with the points.

The operation was performed as follows:

A midline incision extending from the pubes to navel. Omentum found adherent to abdominal wall. Uterus was retroverted and adherent, was studded with irregular projections, both intramural and subserous. Some were firm and

some were soft. The uterus was freed, the ureters exposed, the uterus with tubes, ovaries, parametrium and vaginal cuff removed *in toto*. Rubber drainage tubes were placed in the parametrium on either side. The vaginal opening was closed and the peritoneum sutured over the drains and the vaginal wall.

The patient left the table in a poor condition, suffering from shock, which apparently caused death on the following day.



Fig. 534.—Case IV. Photomicrograph showing large island of epithelial cells lying in cervical tissue. A very distinct pearl shows marked keratinization of the epithelial cells.

Carcinoma of the Corpus Uteri.—We now come to a consideration of carcinoma of the corpus uteri. In these cases the physical findings are meager. Perhaps a uterus which is slightly enlarged may be found. If one feels justified in passing a sound into the uterine cavity, rather pronounced bleeding is apt to be excited by the use of the instrument even when inserted very gently and carefully. In these cases one must rely upon the diagnostic curet. In performing this curetage in a sense

Microscopic examination of a piece of tissue removed from the cervix reveals a squamous cell carcinoma

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Fig 533—Ca IV Ph t g ph f t m d t p e t Th
l p o t f th r v l m t m p l t l y f i l t t d w t h c a o-
m t l l Th p o t f g f t h g w t h c h a t h a g l p a r t
t h t h l p r t f t h r v c a l c a l p b b l y t h l t t Th
m l t p l f i b o m y m t l y g t h w l l f t h p u t

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also a therapeutic measure if the condition should prove not to be carcinoma it is necessary to give an anesthetic dilate the cervix and curet the uterine cavity thoroughly. It is even possible to miss carcinoma of the corpus in curetings which after they are secured should be very thoroughly examined. In this disease one must remember that in its early stages cancer of the corpus does not involve all portions of the endometrium. It begins at various sites and gradually spreads. The initial site may be near the internal os or the uterine cornua or at any intermediate portion of the uterus. There are many other pathologic conditions as well as certain functional disturbances responsible for bleeding from the corporeal endometrium but one must always be certain that no carcinoma is present in these cases. The only way this can be done is by diagnostic curetage.

Case V—Mrs. C. L. G. Aged fifty-four years. Married thirty-five years.

Present Complaint—1. Intermittent bloody vaginal discharge.

2. Considerably worse following exercise.

3. General weakness and lack of endurance.

Past family history unimportant.

Had pneumonia at fourteen years of age, heat stroke thirteen years ago. Has not been well for last thirteen years, weak and tire easily, has periodic headaches, has backache under shoulder and in lumbar region. Menstruation began at thirteen years of age, usually lasting about four days, some pain. Periods stopped for three months about two years ago, since which time she has flowed a great deal.

She has had 5 children, no miscarriages. Labors normal and no puerperal complications.

Present Illness—About two years ago she missed three periods. Since then she has flowed considerably, off and on. This bloody flow has of late been more watery in character. Formerly the flow would come on after physical exercise but now she flows nearly every day unless she lies quietly in bed. She flows for several hours and then stops. She formerly used to skip a month or so. This has not been true lately. She has had some leukor

rhea ever since she began to menstruate but this has been more profuse lately She has not noticed any odor to this discharge She has some nocturia but no dysuria

Examination—Patient is well nourished but somewhat anemic

Bimanual examination Bartholinian cyst about 2 cm in diameter in left labium tear in right sulcus small rectocele and cystocele Urethra negative Cervix slightly lacerated Os

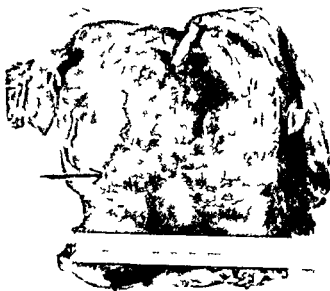


Fig 535—Case V Photograph of uterus removed at operation Fairly normal multiparous cervix Markedly thickened endometrium which shows distinct invasion of myometrium at certain points

is patulous Several polypi can be seen and felt Corpus in good anterior position adnexa were negative

First operation on January 25th Polypi removed from the cervix On January 27th a sound was introduced into the cervical canal This produced a grating sensation and readily produced bleeding

On February 3d a sound was introduced into the uterine cavity This produced bleeding readily The internal os was found to be patulous A piece of tissue removed from the

posterior cervical lip showed an erosion. Some tissue was cureted from the corpus and cervix from which a diagnosis of carcinoma could not be established.

On March 4th the patient continued to bleed. The Bartholinian cyst was removed and a very large amount of soft friable tissue was removed from the body of the uterus. A microscopic examination of these curetings gave evidence of adenoma malignum.



Fig. 536—Cervical photomicrograph showing hyperplasia of the endometrium with glandular proliferation and adenoma malignum.

On March 11th the patient was subjected to a radical operation. A midline incision from the pubes to the navel was made. The uterus with tubes, ovaries, parametrial tissue, and some soft glands from the right hypogastric region were removed. The ureters were exposed. During the operation the ligature upon the right uterine artery slipped. In attempting to control the hemorrhage the right ureter was accidentally clamped. The patient made a smooth convalescence. She had no trouble as a result of the injury to the ureter. Microscopic examination

confirmed the diagnosis made from the cureted tissue. The lymph glands showed no metastases.

The patient was living and well nearly six years following the operation.

Conclusions—1 If we are to diagnose carcinoma of the uterus early the laity should be educated to recognize slight symptoms and physicians should carefully follow up recent symptoms in order to pick up carcinoma of the uterus early in its development.

2 One should not befog the diagnosis with too complicated classifications of uterine carcinoma. There are three locations in which carcinoma of the uterus may be found. These three sites should always be searched for its presence. They are

- (1) Vaginal portio
- (2) Cervical canal
- (3) Corpus uteri

3 Absolute diagnosis may require minor surgical operations such as excision or curetage.

4 Prevention of carcinoma has at the present time no scientific foundation except possibly the elimination of persistent irritation.

5 Early detection is at the present time the only basis for favorable prognosis.

6 Treatment is palliative and symptomatic and should be used to make the patients more comfortable and prolong life.

7 Relative and permanent cures should be sought for in favorable cases using all possible agents to affect a cure such as heat, radium, deep x rays and radical operation.

UROLOGIC CLINIC OF DR GILBERT J THOMAS

UNIVERSITY OF MINNESOTA

PAPILLARY CARCINOMA OF THE RENAL PELVIS IN A CHILD OF THREE AND ONE HALF YEARS

I WAS asked to see a patient with Dr N O Pearce of the Minneapolis Children's Clinic because of hematuria and a mass in the left renal area

The patient was a little girl three and one half years of age

Past History—Slight difficulty with diet during the first few months of her life At twenty two and one half months the patient had measles The recovery was good there were no complications

The present trouble began March 10 1922 at which time the mother noticed blood in the urine The patient was somewhat irritable and fussy and had an afternoon temperature of 99.4 F The day before the hematuria was noticed the child was exposed to cold and she had wet feet About five days before the present trouble she stumbled and fell on her back striking on her doll's head which injured the lumbar region This injury was not a severe one The patient did not complain of one side more than the other The mother says that the child cried at the time for about one minute and not afterward There were no external signs of injury

General examination revealed large tonsils and cervical glands A mass was felt in the left lumbar region below the costal margin On inspection fulness was seen on deep inspiration in the left upper abdomen under the costal arch The mass was not tender The patient had no pain She had a temperature of 99.6 F but there was no other evidence of infection She had not lost weight The hemoglobin was 85 per cent Red blood count 4,500,000

Five days after the first hematuria a cystoscopic examination was made under gas anesthesia. A normal bladder was found. No urine could be seen spurting from the left meatus. The right meatus expelled a large amount of clear urine. Catheters passed with some difficulty through both ureters and into the kidney pelves. Urine containing blood was obtained from the left pelvis. The urine from the right was clear. A bilateral pyelogram was made. The outline of the right pelvis was

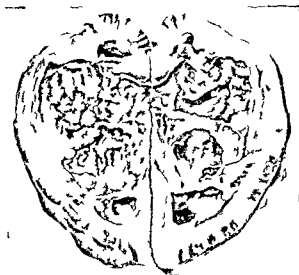


Fig. 537.—Case I. Pelvic carcinoma filling the pelvis and dilating the calyces. The pelvis is filled with blood clot.

normal. On the left side the pelvic outline was large. The calyces were dilated and the ends clubbed. No retraction or other deformity usually seen with a renal tumor was observed. A single cyst into which a blood vessel had ruptured because of recent trauma was thought of but it is unusual to find a dilated pelvis with this condition (Figs. 537-539).

Our clinical diagnosis at this time was (1) Trauma with bleeding causing acute hematonephrosis (2) congenital cyst

or other anomaly with bleeding from trauma (3) neoplasm of pelvis of kidney causing hematuria

We advised that the patient be kept quiet in bed in the hospital and that she be watched carefully. During the next four days the mass did not decrease in size and blood was noticed in the urine on several occasions although this was intermittent.

After two weeks the mass was not smaller probably more tense than before with no tenderness and blood was noticed

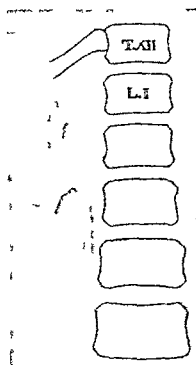


FIG. 538 — Case I. Papillary carcinoma of renal pelvis in a child. Pyelogram of right kidney. No mal pelvic outline.

occasionally in the urine. The patient had gained 1 pound in weight. Her general condition was good. She played normally. It was decided that an exploration was advisable as the tumor did not decrease in size and the urine remained hematuragic.

A left lumbar incision was made exposing a large kidney for a child. The organ was very adherent to the surrounding tissues. Large dilated vessels could be seen over the capsule

The kidney substance was very friable. The pelvis was greatly distended and thinned. The kidney was carefully dissected from the adjoining tissue and partially delivered. When isolating the ureter to facilitate the delivery of the kidney the pelvis ruptured filling the wound with blood and papillomatous material. The ureter was tied separately. The pedicle was isolated and ligated twice after which the tumor was removed. No glands were palpable although a dissection outside the

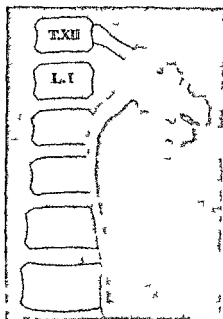


Fig 539—Case I Papillary carcinoma of the right kidney. Pelvis filled with blood and papillomatous material. Ureter pelvis is somewhat

kidney fossa was not done. Penrose drains were put into the kidney fossa down to the pedicle. The patient made a good immediate recovery from the operation. On the second day her temperature was 102.6 F. The temperature gradually subsided so that on the fifth day it was normal.

Dr E. T. Bell, Chief of the Pathologic Department at the University of Minnesota, examined the specimen. His report is as follows:

'The tumor from the renal pelvis shows a fairly smooth deep surface that is it does not infiltrate the walls of the pelvis to a notable extent. Microscopic sections show a tumor composed of squamous epithelium in large masses. There is only a moderate invasion of the underlying tissues. No extensions out to the surface of the pelvis. Diagnosis. Malignant papilloma of the pelvis.

Prognosis. Follow up records of this type of tumor are insufficient to give a basis for an accurate prognosis. The gross and histologic structure of the tumor indicate rather clearly however that it is a growth of moderate malignancy.

There is a gradual transition from a benign papillary tumor of this type to those which are definitely carcinomatous with metastases. It is difficult in an individual case often to estimate the exact degree of malignancy. On the basis of 4 as maximum malignancy this would probably be graded as 2.

Ten days following operation 50 milligrams of radium screened with ordinary thickness of rubber tubing were introduced through the proximal end of the incision for six hours. This was followed by x ray treatment over the left abdomen from Poupart's ligament to the costal arch.

June 14 1922 or two months following operation the patient was examined and found in good condition. She had gained 1 pound since operation. There was no evidence of metastasis or enlarged glands. The patient looked and acted well. Her color etc. was normal.

July 10 1922 a small mass was felt just above the crest of the ileum on the left side which was not easily movable. This was not painful and as the child's bowels had not moved a filled colon had to be considered.

July 14 1922 Fifty milligrams of radium screened with $\frac{1}{2}$ inch of hard rubber and three folds of gauze were placed over the tumor area for twelve hours. There was some nausea the next day otherwise not much reaction. The bowels were hard to move. The tumor was not as prominent after a bowel movement.

July 24 1922 The general condition of the patient was

about the same except that she complained of pain in the left side. The bowels were hard to move. The tumor was somewhat larger. Fifty milligrams of radium with $\frac{1}{2}$ inch hard rubber and four folds of gauze as a screen were placed over the tumor for twelve hours.

The patient's condition did not improve. She had continuous pain in the side and increasing trouble with bowel movements.

August 3 1922 The patient had convulsions so that chloral and codein had to be used for pain. Her condition became gradually worse. She had to be held most of the time because of pain.

On September 22 1922 the patient died. A postmortem could not be obtained.

Comments—Suspect malignancy in every patient with renal bleeding irrespective of age. A pyelogram which has an enlarged pelvic outline or hydronephrosis with renal bleeding is in the majority of instances caused by a renal pelvic or ureteral tumor if stone is eliminated.

This patient had a renal tumor for some time before the history of trauma. The trauma was coincidental and probably had nothing to do with the tumor or with the bleeding. The patient may have had hematuria for some time before the mother noticed it. The tumor grew rapidly because when examined by her physician a few months before the present trouble no masses were palpable. The general health of the patient was good in spite of the fact that she had a malignancy in the pelvis of her kidney.

The subsequent history indicated that metastasis into the glands had occurred before the operation was done although in the adult metastasis does not occur early with tumor of the renal pelvis.

Cystoscopy and pyelography are not done as often as they should be in children. Babies of one year may be cystoscoped with ease. Small instruments are now made so that the infant bladder can be examined with little difficulty. An anesthetic is usually necessary. With small babies 20 grains of chloral

given per rectum is a very satisfactory anesthetic. Pelvic lavage and pyelograms may be done when necessary.

It is possible to make an accurate urologic diagnosis in the child as well as in the adult if cystoscopy, ureteral catheterization and pyelograms are made.

URETHROCELE

I WAS asked to see a young married woman a few days ago because the attending physician when attempting cystoscopy had been unable to catheterize the ureters

The previous history is not complete

The patient had two or more confinements one (I think the last one) being a prolonged hard labor following which she had some repair work done

Her present trouble was frequency of urination of small amounts of urine pyuria and a tumor presenting superiorly into the vagina which was diagnosed a cystocele The attending physician thought that the difficulty experienced in catheterizing the ureters was due to distortion or displacement of the base of the bladder caused by a cystocele The patient's general condition was excellent

The roentgenographic examination of the kidneys ureters and bladder was negative

The urinalysis revealed pus in moderate amount

Cystoscopy disclosed the following The cystoscope passed easily into a cavity about as big as a good sized lemon Thus cavity could not be completely distended because the irrigating fluid escaped around the cystoscope There was no urethra as the cystoscope dropped into a sac as soon as it was introduced through the meatus The mucosa looked as if it had just recovered from a chronic inflammation No ureters could be found The sac was carefully searched for fifteen or twenty minutes without finding an ureteral meatus or other opening Indigocarmine was given intravenously to help locate the ureteral openings but this did not assist as no blue color could be seen in the fluid filling the sac The fluid had to be changed frequently so that I may have missed a slight blue color A congenital anomaly with ureters opening into the roof of the bladder was considered Finally a small opening could be seen

at the extreme upper posterior part of the cavity. This opening was very hard to see. The direct vision cystoscope was pointing toward the ceiling and the eyepiece toward the floor when the opening was in view. After several attempts two No. 6 French shadow casting catheters were introduced through this opening.



Fig 540—C II Ueth cel Rad gr m h g th ocel fill d
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Blue colored fluid was obtained immediately through both catheters. From one the color was concentrated while the fluid obtained from the other was pale. This finding indicated the probability of the catheters having found their way into the ureters. Since only one opening into the bladder could be found

I considered the possibility of the ureters having joined near the bladder into which they opened by one common opening. The catheters when passed through this supposed ureteral orifice felt as if they had dropped into a cavity. There was not the usual resistance found when catheters pass through the normal ureter. A roentgenogram was made to determine the position of the catheters. They were found coiled in the urinary bladder.

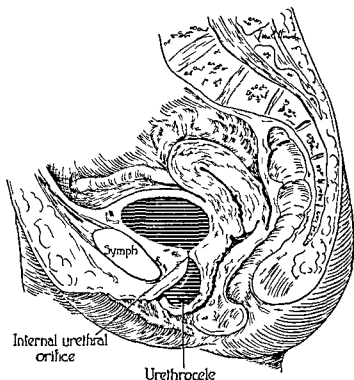


Fig 541—Case II Urethrocele. Diagrammatic sketch to show the relation of the urethrocele to the bladder and adjacent organs. Longitudinal section.

which was apparently in normal position and had a normal shape. The urethrocele was filled with 15 per cent sodium iodid solution and a roentgenogram made. The accompanying reproduction (Fig 539) shows the coiled catheters in the bladder and the urethrocele. A drawing of a longitudinal section through the pelvis is reproduced to show the position of the urethrocele (Fig 540).

REPORT OF A CASE OF HYDRONEPHROSIS OF THE RIGHT KIDNEY OF UNKNOWN ORIGIN

THE patient is a female aged twenty four years who came to the clinic complaining of a tumor in her right side together with hematuria

Family History—Mother died of paralysis cause unknown Father is living and well She has one sister who is well

Past Illnesses—Negative The patient states that she does not remember having been sick before her confinements She has never had previous operations accidents etc

Menstrual History—Menses have been irregular Patient has missed two to four periods at a time When her flow is present it lasts one week and is not profuse

Obstetric History—Patient has 2 babies 1 two and a half years old and 1 five weeks old Her confinements were uncomplicated and in both instances she made a complete satisfactory recovery She has been married five years

Present History—Began in May 1921 at which time the patient was pregnant three months She developed a very severe pain in the right upper abdomen which radiated to the back This was accompanied by hematuria and lasted almost continuously for two weeks The patient was in bed all of the time and vomited constantly She was very constipated As soon as she was able to get out of bed she was moved to a hospital where a general study of her condition was made Physical examination did not reveal the cause of her pain

After five days rest in the hospital pain and hematuria disappeared and she went home At this time the patient noticed a tumor in her right side She thinks it was about the size of a small orange Two weeks later she had a similar attack The pain however was not as severe as before The swelling was more pronounced and the hematuria returned She was again taken to a hospital for study A cystoscopic examination was

made but no definite diagnosis arrived at. Following this attack she had backache which continued through her pregnancy but she did not again notice the hematuria. The tumor in the right side continued to enlarge until it was easily felt in spite of the enlarging uterus. The patient was confined at nine



Fig 542—C III Hydroph of right kidney. Photograph of the specimen. The specimen is a large, irregular, and somewhat lobulated mass, which is the right kidney. It is surrounded by a thin layer of connective tissue. The specimen is shown in a frontal view, with the superior and inferior poles clearly visible. The overall appearance is that of a gross specimen, likely from a surgical or autopsy case.

months and gave birth to a normal baby weighing 8 pound. Following her confinement she had no backache, her strength returned, she regained her lost weight, but noticed that the tumor in her side continued to enlarge. Her only symptoms were tumor in the right side and hematuria.

The physical examination was practically negative except

that a large tumor which was rather tense and about the size of a baby's head was found in the right kidney region. The pelvic examination revealed the tumor pushing the uterus posteriorly where it was held. On inspection of the abdomen the tumor was easily seen. The patient's hemoglobin was 35 per cent with a normal leukocyte count.



Fig. 543—Case III. Hydronephrosis of right kidney. Microphotograph of section through one of the hyperplastic scars showing dense scar tissue and hemorrhage.

Cystoscopic examination revealed the bladder to be negative. Hemorrhagic urine was seen spurting from the right ureter and clear urine from the left side. A ureteral catheter passed easily on the left side; clear urine was obtained. It was slightly difficult to introduce the catheter through the upper end of the right ureter. Force was not used. Bloody urine was obtained through this catheter. With a syringe 5 to 6 ounces of hemorrhagic urine were removed from the kidney pelvis, after which the tenseness of the tumor lessened considerably. The catheter

was allowed to remain in the right ureter for forty eight hours. A pyelogram of the left kidney was made to determine its position and the pelvic outline. Both of these were normal. The function of this kidney was found to be good. The following day the tumor was very soft as the catheter had continued to drain urine for twenty four hours.

A provisional diagnosis of hematonephrosis was made the cause undetermined. Papilloma of the pelvis of the kidney which had grown into the ureter and produced obstruction was thought of. A previous x ray examination had not revealed the outline of either kidney or stone shadows.

The patient was operated upon under gas ether anesthesia on January 30 1923. The lumbar kidney incision as described by Mayo was used. A large tense tumor was found which was dissected from the surrounding tissue with great difficulty. It was very hard to introduce the hand either behind or in front of this tumor as it entirely filled the right abdomen and right pelvis. A trocar such as is used for drainage of the urinary bladder was plunged into the tumor and a rubber catheter was sewed by a purse string suture into this opening. Very little if any of the tumor contents was spilled. The sac was slowly emptied and 2000 cc of bloody fluid obtained. Anteriorly the duodenum was found to be adherent to the sac. This was carefully dissected off. The ureter was isolated. It was not enlarged. There was no evidence of an anomalous vessel of band or other obstruction in or around the ureter. The difficulty found when attempting to introduce the ureteral catheter was caused by the right angle turn which the ureter made before it entered the pelvis. The ureter passed outward from the spine and entered the tumor at its lower outer corner where it entered at right angles. The pedicle was eventually isolated the vessels being very small. After the pedicle had been tied in two places with chromic gut the sac was removed. No accessory kidney could be felt. No glands were palpable. The kidney fossa was drained with several Penrose drains. The usual closure in layers was made.

The patient developed a rise of temperature and a severe

bronchitis on the third day. She recovered from her bronchitis by the sixth day and after that her convalescence was uneventful.

This report is of more than ordinary interest because the specimen did not show any evidence of kidney tissue. The bleeding which produced the hemorrhagic fluid from this side was probably caused by tears in the interior of the sac from the increasing pressure. We could find no cause for this tumor unless it was a congenital anomaly. The patient did not give a previous history of having passed stones or having had any trouble in this or in the kidney on the other side. There was no evidence of papilloma. The red spots which can be seen in the accompanying photograph are hemorrhagic areas of connective tissue formation, bleeding being caused by the splitting of the sac from overdistention.

REPORT OF A CASE OF GRANULOMA OF THE URINARY BLADDER

IN my experience this is very unusual bladder lesion

The patient is a female aged twenty seven years a teacher by profession She came to the clinic seeking relief from frequency and burning at urination

Family History—Her father has diabetes or some kidney trouble One brother died of scarlet fever Otherwise the family history is negative The patient is one of 8 children

Previous Illnesses—Measles and mumps during childhood Quinzy sore throat frequently up to four years ago when the patient had a tonsillectomy She is a frequent sufferer from colds and has a cough most of the time She has a history of food distress indigestion and pyrosis This has not been present for the last two years The patient had enuresis as a child and has had to urinate two or three times every night since that time

Menstrual History—This began at twenty years of age when it was regular and of a twenty-eight day type After two years it became irregular At this time her menses came once every two or three months when she flowed for one day only During the last two years her periods are regular but the flow is very scant

Venereal—Neisserian infection suspected two years ago This history is questionable as Neisserian organisms were not found

Present Trouble—About March or April 1920 the patient had a sudden onset of fever and chills supposedly a cold with severe headache and pain in the lower abdomen and pelvis She was in bed for six weeks following the onset During this time she had severe urgency and burning at urination with a vaginal discharge During the summer the patient was not well but was not bedridden In September she was able to

teach school again Her bladder was lavaged constantly and she was taking urotropin and tincture of hyoscyamus by mouth At this time pyuria and frequency were troublesome In December the home physician made a cystoscopic examination The patient was told after this examination that her trouble was confined to the bladder and urethra She does not know if the ureters were catheterized Bladder lavage was continued with out relief from symptoms She had a second acute attack about two weeks before I first examined her At this time frequency burning at urination and pyuria were present The patient appeared very ill

Physical Data —General impression The patient is a young woman with a slightly anemic appearance She was somewhat nervous and fidgeted in her chair as if she wished to urinate Her temperature was 99.4 F pulse 80 blood pressure 114/70

The *head examination* was negative except that the tonsils had been removed leaving old scars in the throat A slight inflammation of one inferior turbinate

Neck examination negative

Chest Heart area normal Systolic murmur at base disappears on sitting up Lungs clear throughout Fluoroscopy Left ventricle appears pulled to left and there is a little lagging of the left diaphragm Stereoscopic plate of chest reveal a high diaphragm on the left side probably pushed up by gas The heart is a mitral type There is a marked hilar infiltration on the right side There is a fan shaped involvement of the parenchyma extending to the periphery and involving the apices on both sides *Plate diagnosis* Incipient pulmonary tuberculosis questionable

Abdomen Right kidney palpable and somewhat tender otherwise negative

Pelvic Marked edema of labia minora and tissues around introitus Uterus in anterior position normal size Left tube and ovary normal Right tube palpable hard and indurated suggestive of a chronic inflammation Nothing acute Right ovary normal

Extremities Normal no edema or skin markings

Urinalysis The first specimen of urine contained albumin ++++ and 40 to 50 pus-cells per high power field. The phenol-ulphonaphthalein test was 48 per cent. The urinary sediment was stained for tubercle bacilli but with negative results.

Roentgenography of the urinary tract was negative for tone. The outline of neither kidney was visible.

Blood studies Hemoglobin 40 per cent. Red blood cell count 3 016 000. White blood-cell count 6700. Polymorphonuclears 76. Large lymphocytes 1. Small lymphocytes 20. Transitionals 2. Basophil 1. Wassermann test three antigens all negative.

Cystoscopy was done under gas anesthesia. A cystitis which was generalized and graded 3 on a scale of 4 was found. No ulcers were observed. Catheters were passed into both ureters with ease and turbid urine was obtained from both sides. Indigocarmine returned in five minutes from both sides. Bilateral pyelo-ureterograms revealed chronic infection, the ureter being somewhat dilated. Ureteral specimens collected for microscopic examination contained pus. The sediment was stained for tubercle bacilli but none was found. Vaginal and urethral smears were made repeatedly but were negative for gonococci.

Dental examination X-ray disclosed 2 badly abscessed and 2 devitalized teeth.

My diagnosis was (1) Bilateral pyelonephritis and cystitis (2) chronic infection of right tube tuberculous questionable (3) vaginitis and endocervicitis (4) incipient pulmonary tuberculosis questionable (5) caries of teeth.

Treatment consisted of removal of foci of infection, regular pelvic lavage every five days and daily bladder irrigation. Arsenite of iron was given intramuscularly once a day. The bladder symptoms subsided somewhat so that ten days after the first cystoscopy the bladder was more tolerant and the cystoscope could be passed without a general anesthetic. The cystitis had improved greatly. The catheterized ureteral specimens of urine contained less pus.

Six weeks after the first examination the bladder mucosa was clear except for an area on the posterior superior wall which was very red but not raised. This area was very tender and bled easily. The catheterized ureteral specimens contained only a few pus cells.

Nine weeks after the first examination the general condition of the bladder mucosa was good except one area on the posterior superior wall about the size of a silver dollar. The middle of this area was raised, very red and tender and bled easily. The catheterized ureteral specimens were negative and no growth could be obtained on culture. The patient complained of her bladder both night and day. Although our treatment had improved her somewhat in that her general condition was good she was miserable and discouraged. Rest in bed helped some but her symptoms returned with their usual severity when she was on her feet. I had tried all the usual bladder irrigations and topical applications without relief. Autogenous vaccines did not help. The bladder urine contained only a few pus and blood cells. I advised the patient to have the area in the bladder removed surgically because of the possibility of beginning malignancy.

A suprapubic cystotomy was made. An area the size of a five cent piece which was raised at the edges, depressed in the center and somewhat indurated was found in the location as observed with the cystoscope. This small section of the bladder was surrounded by an area the size of a silver dollar which was very red and bled easily. Resection of the bladder wall well outside the affected area was done. The bladder was closed without drainage. A Penrose drain was put into the prevesical space. An indwelling catheter was introduced through the urethra. The bladder healed in about ten days. The catheter was removed after two weeks. There was a slight suprapubic drainage but this diminished quickly until the wound closed completely. A distinct colon odor was noticed during the few days that the bladder drained suprapubically. This was quickly controlled by mercurochrome (2 per cent) injections through the catheter. While in bed in the hospital following

the operation the patient seemed to be free from bladder symptoms. However, after she was home for one month her bladder symptoms returned.

Cystoscopy five months after operation revealed a red, easily bleeding, not raised area of inflammation $1\frac{1}{2}$ by 1 inches on the posterior wall of the bladder. The catheterized bladder urine contains six to eight pus cells per high power field. The catheterized ureteral urines were negative except for a few blood cells. Cultures were negative. Pure silver nitrate fused on a probe was used to cauterize this area through the Kelly direct vision



Fig. 544—Case IV. Granulation tissue showing a large number of capillaries filled with polymorphonuclear leukocytes. There is no epithelial covering.

cystoscope. The immediate reaction was severe, but after this had subsided the bladder symptoms were better. The patient has not returned for a second treatment.

Sensitization tests for all food groups and for animals were negative. The patient has gained 10 to 12 pounds in weight since operation and feels fine except the bladder soreness and frequency.

Dr. E. T. Bell's report of the specimen removed is as follows:

The tissue submitted for examination consists of a growth about 2 cm. in diameter and of rounded shape. The surface which is continuous with the mucosa of the bladder is reddish

and roughened and suggests granulation tissue. Sections through the growth examined with the naked eye show a superficial growth which appears to extend down to the muscularis. It measures from 2 to 4 mm in thickness. It has a hemorrhagic appearance and the under surface forms a rather even line that is there appears to be no infiltration beyond the limits of the mucous membrane.

Microscopic sections show a thick layer of vascular granulation tissue. There are large numbers of capillaries each containing a number of polymorphonuclear leukocytes. The tissue between the capillaries shows extensive interstitial hemorrhage and a great many mononuclear leukocytes, some of which are of the plasma cell type. There are a very few polymorphonuclears outside of the blood vessels. The surface shows no epithelial covering. In the deeper parts of the mucosa the blood vessels are surrounded by thick zones of mononuclear leukocytes and the blood vessels in the muscular layer show a few of the same cells surrounding them.

Diagnosis. A growth composed of granulation tissue. This type of growth corresponds exactly to a growth on the skin which is now called *granuloma pyogenicum* by dermatologists.

There are many diagnostic possibilities concerning this lesion from a clinical point of view. However the pathologist throws many of them out as impossible after he has completed his study of the tissue. I was tempted to let the bladder alone without resection. The patient demanded that something be done to relieve her as soon as possible. The question of malignancy led me to resort to surgery instead of waiting. Pure colon infection in the bladder might produce such a condition which is very hard to cure. Tuberculosis had to be considered although a single ulcer in this location is rare with negative kidneys. Syphilis was thought of but we could find no additional evidence. A tube or other organ adherent to the bladder might produce such a condition but when there is pressure on the bladder the picture with the cystoscope is quite different from what we have here.

Certain kinds of food have produced chronic inflammation or irritation in the bladder. The patient was tested for sensitization toward food with a negative result. Our next step will be to advise the patient to submit to regular hygienic treatment together with actinotherapy as used for tuberculosis.

AN EMERGENCY METHOD OF CONTROLLING HEMORRHAGE FROM THE PROSTATIC URETHRA FOLLOWING THE PUNCH OPERATION

THIS is the second instance in which it has been necessary for me to control a prolonged severe hemorrhage following the punch operation. The first time I packed the prostatic urethra and neck of the bladder through a cystotomy incision.

The patient now under consideration is an old man of seventy seven years who had a prostatectomy five years before the present trouble. I discovered a median bar and a part of two prominent lobes (the right lateral and median) which had recurred or were left at his previous operation. When the patient consulted me he was able to void very little as most of his urine was residual. The patient's general condition was good. His blood pressure was within normal limits for a man of his age. The heart seemed to be in good condition. The blood chemistry was normal. Urinalysis demonstrated only an occasional pus cell.

Under caudal anesthesia the punch operation as described by Young was done with the Braasch modification of the Young instrument. Several bits of prostatic tissue were removed. Before the sheath of the punch was withdrawn two small spurs could be observed in the area operated on. A large soft rubber catheter was introduced through the urethra and into the bladder following which the prostate was massaged. This method before this experience had always controlled hemorrhage in such cases.

Following the operation the patient's urine continued bloody and on the third day because of hiccoughs or a sudden attack of coughing the catheter was forced out. A large quantity of bright red blood was passed through the urethra after the catheter came out. An attempt was made to wash the bladder free of clots and to control the hemorrhage by the reintroduc

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MYOMATA OF THE UTERUS AND PREGNANCY

Analysis of Cases and Discussion of the Question When Shall We Operate Upon Women with Myomata of the Uterus Complicating Pregnancy?

THE case which we have before us today is a pregnant woman near full term with numerous myomata in her uterus. Her condition not only calls for a consideration of the influence which these tumors have had on her in the past and may have in her approaching labor but it also gives us the opportunity of discussing pelvic tumors complicating pregnancy. We will report for purpose of comparison other cases of tumors myomata of the uterus which we have seen during pregnancy labor and the puerperium.

Frequency of Myomata in Pregnancy—There is a great difference of opinion as to the incidence of this condition the figures varying from 0.7 to 42 per cent. This disconcerting disagreement is probably due to the fact that some consider only those tumors which really complicate the obstetric condition and others include all cases with myomata however small. Herbert R. Spencer says "Fibroid tumors complicating pregnancy are quite common. It may be stated with approximation to accuracy that fibroids occur about once in 150 pregnancies. If all sizes of myomata are included my experience gives a higher ratio than this and Munro Kerr states that if one include all cases the 42 per cent. quoted above is not surprising."

When Do Myomata Interfere with Delivery?—Dystocia or unusually severe pressure symptoms seldom occur when the

tumors are located in the upper segment of the uterus unless they are pedunculated and drop down into the pelvis or grow to great size when operation may be necessary.

Myomata located in the lower segment of the uterus or cervix may mechanically interfere with birth or cause malpositions. Tumors at the brim of the pelvis even when projecting considerably into the pelvic cavity are usually pulled up as the uterus grows or by retraction during labor they rise enough to permit the child's head to pass (See Case I Fig 546) If ascent does not occur and manual pressure fail to disengage the head surgical interference will be necessary.

A myoma located in the pelvis on the posterior surface of the uterus causes more trouble than one of the same size on the anterior wall because the promontory of the sacrum interferes with its ascent. Pedunculated fibromyomata are uncertain factors (See Cases V and VII) Sometimes a long pedicle permits so much mobility that the tumor easily slips out of the way of the child on the other hand (see Case V Figs 552-554) on account of the same facility of movement it may drop low in the pelvis and may not be drawn up with the ascending uterus. Occasionally the tumor is not seen until it has grown so large that it becomes firmly imprisoned in the pelvis resisting all efforts to dislodge it. In this location a myoma may cause grave pressure symptoms or an abortion and in labor effectually block the passage of the child necessitating a surgical operation.

Pedunculated tumors may also have a twisted pedicle which calls for surgical interference. The symptoms are almost identical with those of ovarian cyst with twisted pedicle (Case VII).

Effect of Pregnancy Labor and the Puerperium of Myomata
Increased Growth During Pregnancy—Myomata in the pregnant uterus almost always increase in size the rapidity and extent of growth depending on their location in the wall of the uterus. The interstitial variety probably on account of rich blood supply grow most rapidly and to the greatest size. The submucous type often grow to considerable proportions depending on the breadth of their attachment to the uterus (Cases II

and III) likewise pedunculated tumors while less likely to reach a very great size may grow rapidly especially if the pedicle is broad. Occasionally the blood supply is so decreased that necrosis may occur in pedunculated tumors independent of any twisting of the pedicle. The enlargement is due to actual growth of the tumor elements and edema. Some authorities assert that edema is the larger factor but in the few tumors I have enucleated tissue growth far exceeded the edema.

The myomata are so much softer than those found in the non pregnant uterus that they are sometimes so mistaken for cysts.

Decrease in the Puerperium—After delivery the tumors decrease rapidly. It is possible that they never disappear completely but certainly they do become too small to feel. Lordine reported a case in which a myoma as large as the head of an eight months fetus decreased to the size of a hazelnut in twenty two days (Case VIII is an illustration of marked decrease). Munro Kerr says They occasionally do not decrease and sometimes even increase after delivery.

Change of Shape—Changes in shape of the tumors are chiefly due to increase in size of nodules which at the time of physical examination were felt as only small elevations on the surface or even not palpated at all. The most remarkable change is the flattening out of the tumor so that it is not definitely demarked and appears as a marked thickening of the uterine wall. Munro Kerr pictures this condition in an unusual case showing the flattened out tumor extending from the brim of the pelvis to the fundus. Case IV (Fig 551) also shows an example of this.

Impaction—A myoma imprisoned in the pelvis may give no symptoms and slip up into the abdomen with nothing more than signs of discomfort (Case V Figs 552-553) but if the tumor become thoroughly impacted the patient suffers unbearable pain has nausea and vomiting painful urination and sometimes difficult defecation and the signs of threatened abortion (Case III Fig 549) bleeding and uterine contractions appear. In this event if the tumor cannot be pushed out of the pelvis

immediate laparotomy is called for the tumor being dealt with according to its size location and the period of gestation (Cases III and VII)

Degeneration in fibromyomata may call for surgical interference when tenderness and pain are excessive and uninfluenced by rest and sedatives. Enucleation is the operation of choice unless the degenerated tumor has become infected.

Infections occur in myomata in the non pregnant and are more apt to supervene if the tumor is degenerated and it is particularly to be feared in the puerperium especially if the tumor has been injured during delivery. Symptoms of infection do not usually appear till two or three days postpartum. Hysterectomy will usually be the operation of choice but if the infection be limited to a mass which can be enucleated completely without contamination we should hesitate to destroy the powers of reproduction.

Diagnosis of myoma is usually easy but the diagnosis of pregnancy in the presence of fibroids is often very difficult. Many a surgeon has made the tragic mistake of removing a pregnant myomatous uterus. Submucous myomata may be mistaken for the child's head. In early pregnancy when one finds two masses in the pelvis it is often difficult to decide which is fundus and which is tumor.

Phantom Tumor of Pregnancy—I have never encountered the so called phantom tumor of pregnancy mentioned by Munro Kerr. It is described as an isolated contraction of a portion of the pregnant uterus. I wonder if this may not be a mistake in diagnosis due to a misinterpretation of the Braun von Fernwald sign of pregnancy—the one sided softening of the uterus in early pregnancy or to a failure to recognize the Piskacek uterus—pregnancy in one cornu. Time will usually clear up the diagnosis so unless there be a great emergency delay is advised.

Treatment—The treatment of myomata is determined not only by the size location type and symptoms but also by the period of gestation labor and the puerperium.

Management in Pregnancy—First of all I wish to emphasize

the point that therapeutic abortion has no place in the management of pregnancy accompanied by myomata of the uterus. The modern development of surgical and obstetric knowledge and technic have entirely eliminated this procedure as unnecessary and unsafe. A great majority of cases will not require surgical interference during pregnancy unless the tumors seriously disturb the woman, endanger her general health, offer very probable or insuperable obstacles to successful delivery, or finally if they jeopardize her life. However, it is just these occasional dangers that demand our most careful consideration for we want to know whether and when we should operate in pregnancy complicated by myomata of the uterus. In the interest of the child it is usually better to delay operation until after viability if circumstances will permit.

When the tumor is found in the pelvis in the early months of pregnancy try to push it out employing the knee chest or Sims position if necessary. If this procedure fail one may wait to see what nature may accomplish but he must not delay till pressure symptoms cause the patient unbearable suffering or the enlarging tumor too seriously interferes with the functions of the bladder and rectum. Failure to release the tumor especially if accompanied by severe pressure symptoms calls for operation whatever the period of gestation. While it is generally advised to delay operation as long as possible in early pregnancy in the interest of the child and because nature so frequently takes good care of the situation, some few cases demand operation on account of incarceration, size, pressure symptoms, or threatened abortion (Case III Figs 549-550). Other occasional cases should be operated upon as a matter of judgment rather than of demand because the size and location of the tumor and its rapid growth may make dangerous complications of labor so certain and interference with gestation so probable that it may seem wiser to operate early in pregnancy than to wait (Case II).

Choice of Operation—Enucleation is the operation of choice early in pregnancy (Cases II and III Figs 548-550).

If hysterectomy is thought to be the likely choice the opera-

tion should be postponed as long as possible (Case V) except in cases of emergency

I shall not take time to discuss details of operating but shall content myself with a few points in technic that should be carefully observed for the purpose of reducing the danger of abortion. The pedicle of a pedunculated tumor should be clamped as far from the uterus as possible except when the pedicle is very long (Case VII). The enucleation of subserous and interstitial fibroids must be done slowly and very gently. The incidence of abortion following this operation is only 15 per cent but this figure can be still further reduced if meticulous care be taken to reduce the irritation of the uterus to the minimum. Myomata in the pregnant uterus as a rule shell out more easily than those in the non pregnant which may account in part at least for the small percentage of abortions following enucleation. Myomectomy should displace hysterectomy in early pregnancy unless the uterus is too much involved either by the size or the number of tumors. Even myomata deep in the uterine wall (Case III) may be removed without abortion sometimes even when the uterine cavity is accidentally opened.

Another thing that must be carefully observed is the method of introduction and tying of sutures and ligatures. Too large a bite or excessive tension may be factors in producing abortion. Care must be exercised also not to rupture the corpus luteum of pregnancy which may cause abortion independent of manual handling of the uterus.

Too many operators give hysterectomy the preference over myomectomy on general principles and also because the tumors on account of their size look more formidable than they really are and because myomectomy is supposed to be followed by a higher mortality. Wm J Mayo has refuted the idea that myomectomy is followed by a higher mortality than hysterectomy. Case III illustrates the possibility of successful enucleation of very large tumors from the pregnant uterus without abortion following. Too many hysterectomies are done in the early months of pregnancy and not enough attention given to preservation of the sacred function of motherhood.

Management in Labor—Obstetric maneuvers through the vagina are of little avail when tumors block the passage to attempt to drag a child past an obstructing tumor is a very grave error even when it can be accomplished by forceps version or craniotomy. Injuries to the tumor inflicted by forcible delivery are far more dangerous than surgical procedures. If the tumor be in the pelvis an attempt to push it out should first be tried failing this one may in favorable cases await retraction but if success does not follow cesarean section must be done followed by enucleation or hysterectomy as the individual case may require. Tumors of the cervix can rarely be pushed out of the way and they cannot be expected as a rule to retract. Therefore in such cases they must be removed preferably by the abdominal route and by enucleation when possible unless they are submucous and protruding from the cervical canal. Vaginal section is unwise except when the tumor is very small.

Choice of Operation—The choice of operation will depend upon circumstances. Myomectomy or enucleation should be selected whenever the involvement is not too extensive or the tumors too numerous. The dangers of this operation have been overestimated. Either the enucleation or cesarean section may be done first. Following enucleation the child should be taken by cesarean section unless the os is dilated when the child may be delivered by the vaginal route. When doing a cesarean section after enucleation it is wise to go into the uterine cavity through the myomectomy wound when it is favorably situated for such a procedure but usually it will be considered wiser especially if the uterus is greatly involved to perform the cesarean section first followed by enucleation or hysterectomy.

The mortality of cesarean section followed by hysterectomy is twice as high during labor as the same procedure during pregnancy therefore one must be very sure that the operation will not be necessary if he allows labor to proceed. Subtotal removal should take precedence over total extirpation unless infection be present or feared on account of previous improper handling. Cesarean section without myomectomy should not be thought of except when the condition of the patient renders

it necessary to terminate the operation as quickly as possible

Management in the Puerperium—Surgical operation for removal of fibroids after delivery should be delayed until the woman has had sufficient time to recuperate from her parturition and until the myomata have completely involuted. Injury to the tumor followed by necrosis or infection may create an emergency requiring operation during the early puerperium.

CASES

Case I—A secundigravida aged thirty-four. Menstruation began at age thirteen, always regular but painful, interval twenty-eight days, duration three or four days and flow moderate till the age of twenty-five when she noticed gradually increasing flow and the duration was lengthened to six days. For the last two years she has suffered from menorrhagia but no metrorrhagia and her dysmenorrhea which began at the age of sixteen has increased. Last menstruation began January 21, 1922, due October 28, 1922. She was married when twenty-four, conceived first at twenty-eight years and aborted when three months pregnant. The present is her second pregnancy in which she has had some flowing for a week at the third month of gestation. She had some cramps and severe backache but after a week in bed the flow and pain subsided and she has had no other complications. The patient noticed the irregularities in her abdomen but thought they were fetal parts. She is now (October 20th) nearly at full term.

Examination—Woman apparently at full term. Pelvic measurements 25-28-31-21-11.5. Numerous nodules are found on the uterus, the largest about 8 cm. in diameter located on the right anterior surface of the uterus (Fig. 546) at the brim of the pelvis. Others are scattered over the anterior wall of uterus mostly above the umbilicus, one as large as a lemon just below the navel to the left of the midline. Presentation and position O. L. A. The tumors found in this woman's uterus will in all probability not dangerously interfere with her safe delivery because myomata located in the upper segment of the uterus

usually give no trouble unless they are very large. The largest tumor, while it is at the brim of the pelvis (Compare Fig 546 with Fig 555) and now in the way will in all probability be pulled upward by the retraction of the uterus and permit the engagement of the head. Nearly all myomata of the lower segment if they are not too large eventually retract and the child is born spontaneously. Tumors considerably larger than this one will usually give no trouble other than possible delay

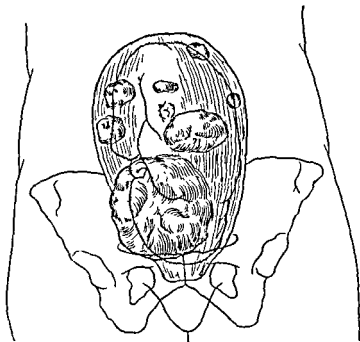


Fig 546—Case I. Showing relatively large myoma which by retraction during labor did not interfere with delivery. Compare Fig 546 with Fig 555.

even when located in the lower segment. It is my judgment that the most we need fear in this case is inefficient pains and prolonged labor, but dangerous uterine inertia is not the rule in these cases. We will however have to be unusually watchful in this case after delivery to prevent postpartum hemorrhage which is a common complication.

There are other interesting features in the past history of this case which frequently accompany myomata of the uterus. We find that she had increasing dysmenorrhea, not uncommon in

fibromyomata Her increasing menstrual flow also significant finally taking the form of marked menorrhagia and we also find from her history that she was sterile the first four years after marriage and that in her first pregnancy she aborted at three months and that she did not again conceive for 12 years and finally she threatened to abort at the third month of this pregnancy all of which occurrences not infrequently happen when the uterus is myomatous

Note—This woman was spontaneously delivered of a living baby boy one week later after a normal though prolonged labor of thirty one hours She did not have postpartum hemorrhage This case is quite typical of the usual outcome

While the incidence of fibroids complicating pregnancy is high it is relatively seldom that real complications arise Nature assisted by modern obstetric knowledge and skill so often successfully overcome the difficulties that a conservative attitude is taken by most obstetricians Conservatism however does not here mean inaction The real conservative is he who knows when to adopt radical measures as well as when to avoid them There are a certain number of pregnant women with myomata of the uterus whose welfare as well as that of their babies will demand surgical operations

It is to this class of cases relatively rare but in the aggregate amounting to a considerable number that I wish especially to direct your attention

The necessity for surgical interference does not depend upon the mere presence of the tumor but upon their size location rate of growth and symptom particularly those of pressure

Case II—Miss F later Mrs S aged twenty eight Menstruation began at age twelve thirty day type amount of flow moderate There were never any clot The number of napkins were two or three a day

First consulted me in February 1919 for relief of backache which she attributed to female trouble Two myomata were found in her uterus one the size of a walnut located on left anterior surface of the uterus about the region of the internal

as the other twice as large was located on the posterior surface and to the right (Fig 547) No other gynecologic conditions to account for the backache were found Her backaches were due to double sacro-iliac strain of which she was relieved by strapping She was told of the presence of the myomata and advised that they had no relation to her complaint and that as they were giving her no symptoms she need not worry about them She was however instructed for the sake of safety to

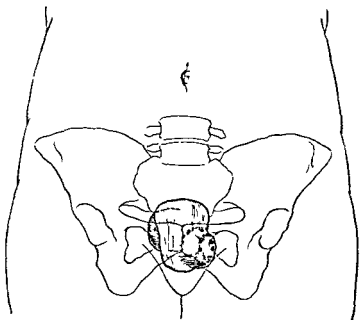


FIG 547—Case II Showing myoma of the uterus found before pregnancy Same uterus pregnant at three and a half months shown in Fig 548 Broken line indicates point of tumor on posterior surface of uterus

report for examination every six months or so in order that she might be assured that the tumors were not growing She was informed that on account of their small size they would probably never give her any trouble unless she should marry and conceive in which event she was instructed to be examined as early in her pregnancy as possible because during conception the tumors might be expected to grow Two years later in December 1920 at the age of thirty she was married—now Mrs S She conceived in the first month of her marriage and remembering

my warning that the tumors might grow in case she became pregnant she very early in her pregnancy sought the advice of a physician in a distant city to which she had moved after marriage. He found that the tumors had increased considerably in size and she was sent back to me for examination.

She consulted me on April 20 1921. Her last menstruation which was less than normal was on January 1 1921. She was therefore three and a half or four months pregnant due October 8 1921. She had complained of severe backache since April 13th otherwise the course of the pregnancy up to this time had been normal. On physical examination the uterus was found to be pregnant approximately three and a half months. The two fibroids found in her uterus before her marriage had markedly increased in size. My history notes say: The two small fibroids felt at a previous examination February 1 1919 one on the anterior surface to the left and a larger one on the posterior surface to the right have grown very markedly and together effectively block the pelvic canal. On account of the rapid growth pressure symptoms and location of the tumors an operation for an immediate removal of the fibroids was advised.

Operation—Two days later on April 26 1921 laparotomy was performed for the removal of the tumors. On opening the abdomen a pregnant uterus of three and a half or four months gestation containing 4 myomata was found. We had palpated only two masses before operation the one posterior which we diagnosed as the larger tumor proved to be two fibroids very close together which had given us the impression of one large irregular tumor the two together after removal measuring $8 \times 5_2$ cm. The anterior tumor measuring 8×12 cm after removal was much larger than we had calculated because it was so deeply embedded in the uterine wall (Fig 548). It was situated near the internal os and extended out into the left broad ligament. Another myoma 3×1 -cm after removal which had not been recognized was found just above the larger tumor. All were slowly and gently enucleated deep bleeding was controlled by mattress catgut sutures great care being exercised.

not to tie them too tightly and the raw surfaces were approximated with even more than usual care because we wished to avoid any undue tension which might cause abortion. The patient recovered without complications and was delivered normally at term after a ten hour labor.

When one operates upon a pregnant woman with myomata of the uterus, particularly when he operates in the early months of pregnancy he is called upon to defend his position because

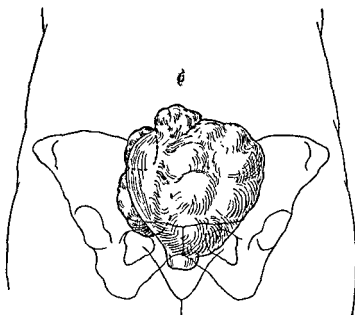


Fig. 548—Case II. Showing the same uterus as pictured in Fig. 547 pregnant three and one half months. Tumors very greatly enlarged. Removed by enucleation after which patient went to full term and was normally delivered. Dotted lines indicate the portion of the smaller tumors on the posterior surface. This figure also shows two myomata not palpable before pregnancy (see Fig. 547).

the condition so infrequently requires operation and if surgical procedures are used at all many advise awaiting developments later in pregnancy or in labor. This woman was operated upon early because of the location, size, rapid growth of the tumors and pressure symptoms.

The location of the anterior tumor well down in the lower segment had already grown from the size of a walnut to from six to ten times that size. It was not only so low and so large

and still growing that it alone would probably interfere seriously with delivery but opposite to it on the posterior surface a little higher up was another tumor in such a position that we feared that the two would as it were act together in their interference. These considerations together with probable much increased growth led us to abandon our usual conservative attitude and decide to operate. We chose enucleation in preference to hysterectomy because we do not believe in removing the uterus early in pregnancy if it can possibly be avoided. To make a woman incapable of motherhood requires a decidedly positive indication. If we had believed hysterectomy indicated we would have awaited full term when a cesarean section followed by hysterectomy would be the operation of choice.

Case III—Mrs. L. aged forty three gravida I. Last menstruation February 21 1921 therefore she was about three months and ten days pregnant.

This case was seen in consultation with Dr. Ivar Sivert on June 14 1921. The cervix uteri pointed upward and forward behind the symphysis pubis. The enlarged soft pregnant uterus was incarcerated in the posterior pelvis firmly against the promontory of the sacrum. The mass in the pelvis had the soft characteristic elastic feeling of a pregnant uterus. Efforts to dislodge the uterus from the pelvis were unavailing. A large irregular hard mass felt extending from the symphysis pubis to 5 cm. above the umbilicus was diagnosed as a fibroid. Other smaller tumors were palpated in the lower and upper segment of the uterus. On account of the inability to dislodge the pregnant uterus from the pelvis we were fearful that the great size of the tumor would prevent its rising and there was great danger of causing an abortion. Her pelvic measurements were large and we felt that there was no doubt she would deliver at full term if she could be relieved of the complicating tumor without aborting. We thought there was no chance of her going to full term on account of the imprisoned uterus and particularly on account of the great size of the abdominal tumor. I think if you will look at the accompanying illustration (Fig

549) you will agree with our conclusions that an abdominal operation was advisable

On June 21 1921 she was operated upon by Dr Sivertson and the author Much to our surprise we found that the pregnant uterus had come out of the pelvis and had rotated distinctly toward the left but we still believed that on account of the size of the tumor an enucleation of the fibroid was indicated The bladder was found to be very high reaching half way to the umbilicus drawn up by the tumor The origin of the large tumor

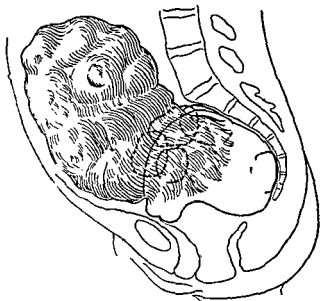


Fig 549—Case III Showing retroverted pregnant uterus incarcerated in pelvis with large myoma extending 5 cm above the umbilicus Removed by enucleation Broken lines indicate tumors behind the uterus hidden on account of abnormal rotation

was very broad covering almost the entire anterior surface of the uterus We discussed whether it were better to do a hysterectomy or an enucleation but we finally decided in favor of the latter A longitudinal incision was made over the fibroid mass and with a small amount of cutting by the scissors we were able to enucleate the tumor It had a very extensive and deep bed extending far down into the lower segment of the uterus Ligation of the vessels was necessary and mattress sutures were introduced and tied gently—sufficient only to control hemor

orrhage We were careful not to make the sutures tight Too tight tying is one of the causes of abortion in enucleation of fibroids from the pregnant uterus

In size the tumor was 7 inches long 6 inches broad and 5 inches thick a very large tumor for a uterus a little more than three months pregnant There were several smaller myomata 2 in the lower and 3 in the upper uterine segment all of which were removed In all our manipulations we were particularly careful to avoid rupture of the corpus luteum pregnancy which was found in the right ovary because this in itself may cause abortion The patient left the table in good condition As soon as he reached her bed morphin was given synergistically (Gwathmy) that is $\frac{1}{8}$ grain morphin and 3 c c of 25 per cent sterile chemically pure magnesium sulphate This was continued for a few doses to reduce the possibility of abortion The patient had an uninterrupted recovery There were no symptoms of threatened abortion at any time She left the hospital in good condition

I am indebted to Dr Svertson for the following postoperative and delivery notes

July 25th One month after operation the patient's condition is very fine Her only trouble is constipation

August 17th Patient's condition is very good Has felt fetal movements The uterus is two finger breadths above the umbilicus

December 3 1921 In labor At 4 A M December 3 1921 the membranes ruptured She was delivered at 9 45 A M December 3d of a living baby girl weighing 9 pounds Hemorrhage was moderate although the uterus seemed to have a tendency to soften up There is a feeling of hardness near the midline which is probably the scar tissue of the uterine wound following the nucleation Mother and baby left the delivery room in good condition The delivery occurred on the two hundred and seventy ninth day after the last menstruation Her puerperium was normal

The primary conditions leading to a decision to operate upon this woman were the incarceration of the pregnant uterus be

neath the promontory of the sacrum and the excessively rapid growth leading to the great size of the tumor so early in pregnancy and the pressure symptoms. We were of the opinion that the weight of the large tumor was a factor in preventing the rise of the imprisoned uterus out of the pelvis and on account of the retroflexion of the womb and the pressure symptoms complained of by the patient we feared an abortion which would be a particular calamity in this case because she was an

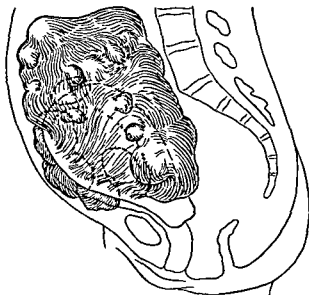


Fig 550—Case III. Showing same uterus as Fig 549. Note distinct rotation of uterus and tumor to left following release from forces holding them in abnormal twisted position in the pelvis. Broken lines parts of tumors on posterior surface and dotted line shows area of attachment of the large tumor on the anterior wall.

elderly primigravida forty three years old. Furthermore we felt that even if the uterus should rise out of the pelvis the tumor was a real menace both to her pregnancy and to her labor. We were mistaken in our conclusions that the incarcerated uterus could not be liberated for we found the uterus above the brim (Fig 550) of the pelvis at the operation but we still had the very large myoma to deal with. After the abdomen was opened the decision between enucleation and hysterectomy was not an easy one for the large tumor with the

five smaller ones made the task look rather formidable. However we chose enucleation rather than to deliberately sacrifice the baby and abandon all future hope of offspring.

Case IV—Mrs B. This is one of those rare cases of flat interstitial fibromyoma of the uterus (Fig 551). It was in the lower segment extending somewhat below the brim preventing the head of the baby from entering the pelvis. She was first

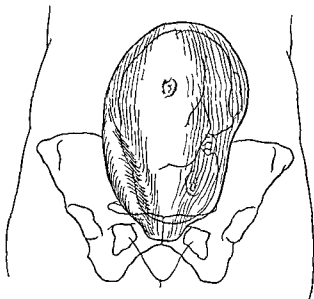


Fig 551—Case IV. Illustrating flattened interstitial myoma of the uterus which would probably interfere with delivery. Tumor restricted delivery of the woman would be impossible.

seen in labor after she had been having pains for many hours and it seemed that the head could not possibly enter the superior strait. This case impressed me very profoundly because it was seen during my student days in Professor Schauta's Clinic. All of his assistants were of the opinion that the woman would not only be unable to spontaneously deliver but that she could not even engage the head. While my advice was not asked I was very strongly of the opinion that the assistants were

correct in their conclusion and I was very much surprised when Professor Schauta after examining the woman said that she would deliver normally which she did several hours later.

This case forcefully illustrates the fact that we must not be in a hurry in forming conclusions that a baby cannot be born spontaneously because there is a tumor in the lower segment for the powers of retraction of the uterus are so great that even tumors which seem impossible of ascent will be drawn upward and out of the way of the presenting part.

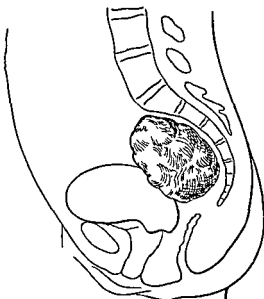


Fig. 552.—Case V. Showing myoma of uterus incarcerated in pelvis posterior to three months pregnant uterus. This proved to be a pedunculated tumor found at different examinations in three different positions. (See Figs. 553-554.)

Case V—Mrs. A., aged twenty-three, primigravida. Presented herself for examination when three months pregnant. The uterus was anteriorly easily diagnosed as a pregnancy but was pressed markedly forward against the symphysis pubis and the abdominal wall. The vaginal examination revealed a hard mass (Fig. 552) behind the uterus fixed underneath the promontory of the sacrum. The tumor was about 6 by 10 cm. in size, very hard, immovable, and it seemed to me that if it con-

tinued to grow rapidly that even if it should ascend into the abdominal cavity or could be pushed up that its size alone would materially interfere with delivery. I did not tell the patient of my fears but informed her husband that the tumor would probably not make an operation necessary during pregnancy as there was a chance of it ascending spontaneously or of being pushed up. He was told however that at the time of delivery we would probably perform a cesarean section. She

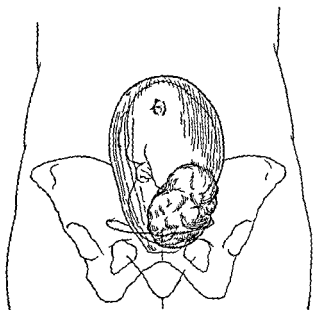


Fig 553—Case V Same tumor as shown Fig 552 at the 7th month of pregnancy. Position of tumor now ant. to the uterus.

was ordered to report frequently for examination which she did. At the seventh month I was not very greatly surprised to find that the tumor had risen out of the pelvis because I have seen this occur very unexpectedly in cases in which we thought such an event impossible but I was very much astonished to find that the tumor now was not lying posterior to the womb but anterior and to the left and now that it was more accessible it was found to be oblong and larger. It was not entirely out of

the pelvis the anterior pole being below the brim behind the symphysis but the greater portion of the tumor was lying above the pelvic brim (Fig 553) It was somewhat movable I was still of the opinion that the tumor would probably interfere with delivery but I did not feel quite so sure of my ground as I had at the previous examination on account of the location of the tumor and its moderate mobility I thought it might be a pedunculated fibroid with a short pedicle which could be pushed

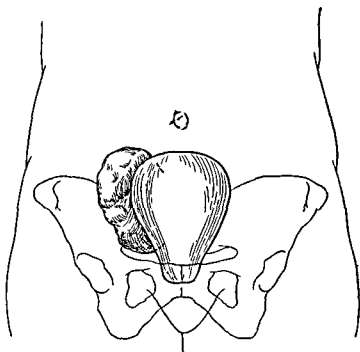


Fig 554—Case V Same tumor as shown in Figs 552 553 now shown posterior to the uterus immediately after delivery Tumor evidently had a long pedicle

out of the way during labor but I still believed that we would need to do a laparotomy at the time of delivery

At seven months I found the same condition but at eight months I was dumbfounded when I was unable to find the tumor at all It could not be palpated anterior to the uterus it was not in the pelvis and therefore I concluded that it had slipped behind the uterus where it could not be definitely palpated During pregnancy it is not uncommon to miss the diagnosis of

an ovarian cyst which may be hidden behind the uterus but to be unable to find a tumor of this size which had previously been palpable was rather disconcerting. The head was now engaged and of course I now knew that the baby could be born spontaneously and informed the husband that the operation would not be necessary and to make a long story short she was uneventfully delivered of a normal child.

Immediately postpartum the tumor was found as I had anticipated posterior to the uterus but to my surprise on the right (Fig 554) instead of on the left. Evidently this tumor was one with a long pedicle because I found it in three different locations first behind the uterus in the pelvis second out of the pelvis in front of the uterus on the left side and in the puerperium posterior to the uterus on the right side.

This woman has only recently been delivered. What our further procedure will be will depend upon the size of the tumor after involution is complete. My opinion is that at the proper time it will require surgical removal because although she came through this pregnancy without complication we may not be so fortunate the next time and I fear there is danger of a twisted pedicle where there is so much mobility.

Case VI—Mrs I. Age twenty three. She was seen first in beginning labor. She had several fibromyomata in the fundus of the uterus and one tumor of moderate size about 4 inches in diameter in the lower segment on the left anterior wall of the uterus palpable per vaginam partially in the pelvis and partially above the brim (Fig 555) lying in a position which shortened the right oblique diameter of the pelvis. This is the type of tumor that in my judgment would in all probability ascend during labor with the retraction of the lower segment. This usually occurs with tumors in this location even when they are quite large as in Case I (compare Fig 555 with Fig 546). In the absence of any other complication I should have advised that the woman be permitted to go on in labor and would have expected her to deliver but she had a moderately generally contracted pelvis with the following measurements between

anterior superior spines 23 cm between the crests of the ilium 25 cm between the trochanters 29 cm external conjugate 17 cm and the diagonal conjugate from the lower border of the symphysis to the promontory of the sacrum 10 cm giving us an estimated true conjugate in this type of pelvis of 8 cm

We have here then also to consider the possibility of delivery in a borderline contracted pelvis in which the chances of

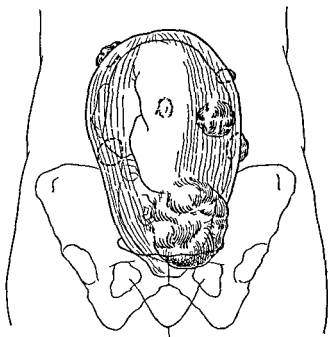


Fig 555—Cas VI Showing myoma at brim of pelvis which under usual circumstances probably would have retracted permitting spontaneous delivery (compare with Fig 546) but moderate contraction of the pelvis also being present cesarean section was done illustrating how two complications neither one of which would alone be an indication for a cesarean section but combined furnished such an indication

spontaneous birth are moderately good We know that in all degrees of contracted pelvis taken together about 80 per cent deliver spontaneously and that with a conjugata vera of 8 to $8\frac{1}{2}$ in the neighborhood of 40 per cent will have normal births and the percentage is very greatly increased if we add to this the cases that will be successfully delivered of a living child by forceps after engagement of the head As far as the pelvis alone

is concerned we would certainly have given her the trial of labor with reasonable expectation of a spontaneous delivery. We have here then two complications of pregnancy neither one of which alone is a positive indication for surgical interference but in our judgment the presence of the two complications together the tumor and the borderline degree of contraction justified the conclusion that operation was indicated. Therefore cesarean section was determined upon and successfully performed resulting in a living baby and mother who recovered promptly.

There is room for a difference of opinion in this case but we came to our conclusion on the grounds that the two questionable factors added together gave us a sum of possible difficulties which justified our course.

Case VII—Mrs. K. aged thirty two nullipara. Married nearly ten years never pregnant before. On physical examination the patient was found to be three months pregnant with a fibroid in the pelvis near the brim and according to our judgment surgical interference was not indicated because we believed that the tumor would either ascend with the growth of the uterus or would retract during labor. Three weeks after the examination however she was taken with a very acute severe pain which was not like the characteristic pains of a threatened abortion but similar to the symptoms of a twisted pedicle of an ovarian cyst. The patient lived near Minneapolis and was immediately transported to the hospital placed in bed and given sedative. On physical examination we found that the tumor had risen out of the pelvis that the uterus and tumor were painful and the tumor particularly sensitive to pressure and it was very freely moveable. We made a diagnosis of the fibromyoma with twisted pedicle. The abdomen was opened and the twisted pedicle tied incised and covered with peritoneum. The patient made an uneventful recovery. She left the hospital at the end of two weeks has had no further symptoms and is now pregnant in her eighth month.

Pedunculated fibroids are not very uncommon but twisted

pedicle occurs less frequently than with ovarian cysts probably because the pedicle is apt to be broader and the tissue of the pedicle firmer

Case VIII—Mrs W I was called to see this case three days postpartum she had been delivered normally but had developed a temperature which seemed to be accounted for by a respiratory infection I was called to exclude the possibility of the temperature being due to a pelvic infection In the course of the examination I discovered a myoma arising from the right wall of the uterus extending out to the pelvic brim By abdominal palpation I estimated the size of the tumor to be about 5 inches long 3 inches wide and 2 inches thick The great reduction in size of the myomatous tumors following delivery is well illustrated in this case

Three years later I had occasion to operate on this woman for another pelvic condition Before opening the abdomen remembering that we had previously found a myoma in her uterus we endeavored to locate the tumor by bimanual palpation but were unable to do so If we had not opened the abdomen we might have reported as others have that myomata sometimes disappear after delivery but after the uterus was exposed we found that the tumor which was 5 inches long before was now very small no larger than a hickory nut

Case IX—Mrs G aged twenty seven primigravida Pregnancy normal except that several small myomata were found scattered over the body of the uterus No large ones were detected Position and presentation O L A She had gone through a normal pregnancy but engagement had been slow and all advised application of high forceps had resulted in the death of the baby before a consultant was called Even after perforation of the head of the dead fetus and application of the cranioclast delivery of the shoulders was still impossible

Seeking for the cause of interference a submucous fibroid about 5 cm in diameter was found protruding from the uterine wall into the space between the fetal head and the anterior

shoulder pressed firmly against the neck and preventing the passage of the shoulder (Fig 556) After rotating the shoulders into the opposite—right oblique—diameter delivery was accomplished with no further difficulty

The tumor was on the inner left lateral wall of the uterus and had evidently grown into its position as it and the baby developed together A thorough examination during pregnancy or early in labor would possibly have revealed the presence of this tumor which by its peculiar location was bound to interfere

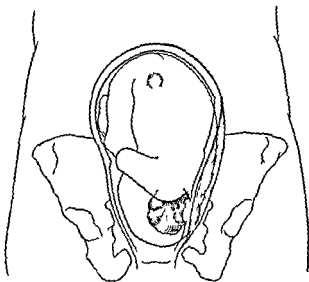


Fig 556—Case IV. Showing submucous myoma projecting into the true cavity but not interfering with the engagement of the head but interfering with the delivery of the shoulder

with the descent of the shoulder and the shoulder prevented the retraction of the tumor Probably a cesarean section would have been the only means of getting a living baby

This tumor was in a very unusual location and it would have been undoubtedly a very difficult thing to have made a diagnosis but I think a trained obstetrician would have located the difficulty and have recognized the necessity of a cesarean section

CONCLUSIONS

While myomata in the pregnant uterus are common they seldom dangerously complicate pregnancy labor or the puerperium and still less often require surgical interference. However a few cases require operation on account of size rapid growth location in the lower segment, incarceration in the pelvis pressure symptoms threatened abortion, or when accompanied by contracted pelvis. To determine which exceptional cases should be operated demands acute obstetric and surgical judgment therefore no operation for myomata of the pregnant uterus should be undertaken without the opinion of an experienced obstetrician.

CLINIC OF DR WARREN A DENNIS

MILLER HOSPITAL ST PAUL

CASE I SUBACUTE PERFORATION OF GALL BLADDER WITH INTRAPERITONEAL ABSCESS FORMATION

THIS patient is a woman thirty nine years of age the mother of 3 children, the youngest fifteen years of age She had diphtheria seventeen years ago and was subject to tonsillitis until the tonsils were removed six years ago Previous to the present illness she had had three severe attacks of abdominal pain one two years ago when she was confined to bed two weeks one five months ago and one seven weeks ago Her physician says she had no fever with any of them The pain commenced in the epigastrium and was very severe and continuous It showed a tendency to radiate to both shoulder blades but eventually localized just above McBurney's point The present attack commenced eight days ago with severe continuous pain in the epigastrium radiating to both shoulders The following day her physician was called and administered morphin The next day it was still severe but had moved to the right lower quadrant Just above the area a mass the size of an orange developed in the next few days A diagnosis of gall stones had been made but I felt some uncertainty because of the entire absence from the history of food idiosyncrasy or gas belching and because the greatest tenderness was located as low as the umbilicus The persistency of the pain and the slight fever that now appeared 100 F were strongly suggestive of an acute empyema of the gall bladder, but the tender area and mass (Fig 557) were too low and there was a zone between this and the liver margin that was free from tenderness The leukocyte count showed 19 550 with 89 per cent of polymor

seemed to point pretty definitely to a retroperitoneal cause. It still appears so and I am entirely unable to account for it.

Subsequent History—The patient left the hospital thirteen days after operation and has been perfectly well ever since except for a sinus at the point of drainage. Two and a half months afterward about a dozen more small stones were discharged.

Several weeks later after colicky pain several dozen more small stones escaped but the sinus persists. Evidently the rupture in the gall bladder persists and that organ is not yet free from stones.

As pointed out some years ago acute empyema of the gall bladder presents almost invariably a stone impacted at the entrance to the cystic duct and I believe it is the impaction at this point that determines the empyema. The cystic artery approached the gall bladder from above downward and outward and not parallel with nor in close relation with the cystic duct. For this reason a stone impacted in the duct causes no interference with the blood supply of the gall bladder while one lying in the ampulla at the entrance to the duct makes pressure upon the wall at the point where the cystic artery enters it. The circulation is thus impaired and empyema readily results.

CASE II SUBACUTE PERFORATION OF GALL BLADDER WITH INTRAPERITONEAL ABSCESS FORMATION PERNICIOUS ANEMIA

THE pathology in Case I presents a feature so uncommon that it may be of interest to report briefly another case with an intraperitoneal abscess of like origin and almost identical features but presenting in addition another entirely different pathologic entity.

This patient was a woman sixty four years of age the mother of 6 children. She had had two or three attacks of jaundice in the past five years each lasting about a week not accompanied by severe pain or causing confinement to bed. During the preceding three or four months she had noted a loss of appetite belching of gas and weakness also occasional numbness of the hands. Examination disclosed a mass the size of a grape fruit located beneath the right rectus muscle at the level of the umbilicus. It was rounded smooth fairly firm and tender. It did not move with respiration. There was a non sensitive zone between it and the liver margin. There was constant dull pain in the mass and at times pain beneath the costal margin not radiating to the back or shoulder. The skin showed no jaundice but had a peculiar pale appearance. There was little loss of flesh. The urine showed a trace of albumin but no casts. Her hemoglobin was 38 per cent red count 1 490 000 white count 9450 with 86 per cent of polymorphonuclears. The temperature ranged from 99.3 to 103.2 F pulse from 90 to 110. The mass was evidently inflammatory and incision under gas resulted in the evacuation of 400 or 500 cc of rather thick pus. The walls of the abscess were made up of adherent coils of bowel and the abdominal wall. The free peritoneal cavity was not opened and no further evidence was obtained to indicate the origin of the infection but the gall bladder was suspected.

The subsequent history shows that drainage ceased in about a month but three months later the patient was readmitted to the hospital complaining of the same pain beneath the right costal margin slight swelling of the ankles shortness of breath and weakness In contrast with these symptoms she had lost little in weight the subcutaneous fat was well preserved The skin presented a sallow not jaundiced appearance The tongue was pale and she complained of a constant bitter taste The knee jerks were absent The suspicion was now aroused that perhaps we had also a pernicious anemia and a reference to her previous blood findings lent weight to the suspicion although her blood picture now showed nothing that might not result from a severe secondary anemia hemoglobin 36 per cent red blood count 2 830 000 white 1850 polymorphonuclears 46 per cent lymphocytes 52 per cent anisocytosis marked poikilocytosis slight in occasional normoblast x Ray disclosed a shadow which was apparently that of a single large stone in the gall bladder After transfusion with 500 c c of citrated blood the stone was removed under local anesthesia but no definite improvement followed and subsequent blood examinations pointed more and more strongly to a definite diagnosis of pernicious anemia

She remained in the hospital two months during which time she received three more transfusions when the hemoglobin was 58 red count 2 090 000 white 4100 (P M N 55 per cent lymphocytes 45 per cent) anisocytosis marked poikilocytosis slight nucleated reds none The improvement proved quite transitory and in spite of a fifth transfusion the patient has steadily lost ground and died of pernicious anemia

In this case the pernicious anemia should probably have been recognized much sooner but in the beginning was overshadowed by the unusual surgical condition and later was thought possibly to be a severe anemia secondary to demonstrated old empyema of the gall bladder with the typical finding of stone impacted at the entrance to the cystic duct

This case and the preceding one demonstrate the importance of pyelography in the diagnosis of obscure abdominal tumor

CASE III DERMOID CYST OF THE PANCREAS

THIS case presented originally a problem in diagnosis which has now resolved itself into one of treatment. The patient is a married man forty years of age who first presented himself for diagnosis and treatment over a year ago. His complaint was of rheumatism chiefly in the back and mostly on the right side. This trouble had commenced three years previously and a simple appendix operation had been done about twenty years



Fig 559 —Case III Cyst of pancreas calcium deposit in walls

before. His appetite was good and the bowels regular but he complained of gas rolling in the abdomen after meals and without dependence upon the character of the food eaten. There had been no loss of weight or failing in general health and he had been able to work regularly.

Examination at once disclosed a mass (Fig 559) about the size of a grape fruit chiefly in right upper abdomen but extending

slightly to the left of the midline. It was firm, smooth and regular in outline and slightly sensitive to pressure. It did not move with respiration and there appeared to be a slight interval between it and the liver dulness. There was nothing in the past history to throw any light on the nature of the tumor and the urinary blood and other physical findings were negative. The diagnostic possibilities considered were tumor of the kidney, cyst (echinococcus) of the liver and tumor of uncertain retroperitoneal origin. A pyelogram (Fig. 560) pretty definitely



Fig. 560—C III Cyt f p pyl g m l m t g k d y
p bl f m

eliminated the first and the fluoroscopic demonstration that the duodenum lay on the anterior surface of the tumor should probably have excluded the second which was regarded as the most probable one in spite of this finding.

Incision from the ensiform cartilage downward and slightly to the right showed that the mass lay behind the posterior peritoneum. Exploration through the gastrohepatic omentum showed pancreatic tissue covering the surface of the tumor as did also that through the gastrocolic omentum and that made

from the right side behind the duodenum which was displaced forward. The conclusion was inescapable that the tumor originated in the pancreas itself. Because of the intimate relations of important structures to the mass which was now felt pretty certainly to be cystic removal appeared too hazardous to be undertaken. The gastroduodenal vessels lay on its surface the abdominal aorta and inferior vena cava were behind the portal vein behind and the common duct on the right. Marsupialization was accordingly done and the cyst opened the incision traversing about 1 cm of pancreatic tissue before the firm and



Fig 361 —Case III Cyst of pancreas

rather fibrous cyst wall was exposed. The contents disclosed the grumous greasy material characteristic of dermoid cysts as well as a few short hairs. There was a considerable amount of calcareous deposit in the lining.

Dermoid cyst of the pancreas is apparently very rare. The only other case I have been able to find is that reported by Judd in which the cyst occurred in the tail and was removed *in situ* without opening. Because of the nature of their lining dermoid cysts yield notoriously unsatisfactory results following simple drainage. Had the real character of this one been known it

would perhaps have been wiser to accept the additional risk involved in extirpation without opening though this would certainly have been great. The cavity still drains. Zenker's fluid was first employed and later radium in an attempt to produce necrosis in its lining membrane. Neither produced appreciable results though the radium was introduced once only because of fear of effects beyond the cyst wall as well as the obvious inability to affect all parts equally. Multiple strength Dakin's solution after the plan employed with such success by Gatch in old empyema cavities is now being tried. A profuse watery discharge persists though the man is in excellent general health and works daily. The accompanying x rays (Figs 361-362) show the reduction in the size of the cavity.

CASE IV FIBROMA OF OVARY FIBROMA OF LABIUM MAJUS

THIS case presents two points of interest The patient is an unmarried woman thirty five years of age She is large and strongly built and weighs 230 pounds She comes complaining of swelling of the left leg which has been present continuously for the past six months For a week there has been some discoloration of the skin like that seen in varicose veins There

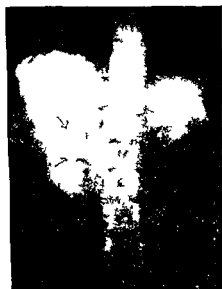


Fig 56?—Case IV Cavity remaining after thirteen months of drainage (injection with sodium bromide solution)

had been slight swelling in both feet disappearing overnight before the advent of the persistent edema in the left leg Except for this trouble she says she is in perfect health save that five days before menstruation she has pain in the left lumbar region which is entirely relieved by the application of hot towels and evacuation of the bowels following a dose of citrate of magnesia The flow itself is painless and normal in amount

Examination shows marked swelling of the left limb and slight swelling of the right. The veins are somewhat varicose on both sides. Palpation reveals an abdominal tumor rounded hard and smooth and extending from the pubis to a point on the right side 3 cm above the navel. On the left it reaches a level 2 or 3 cm below the navel and there is a sulcus between the two portions. On vaginal examination a hard smooth mass is felt projecting downward behind the symphysis but the cervix cannot be reached. A diagnosis of fibromyoma of the uterus is made.

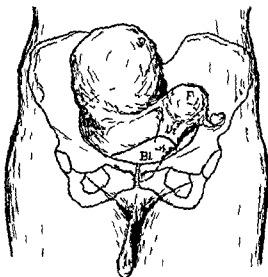


Fig 563—C. IV Sketch of large fibroid of right ovary completely filling pelvis and distending up posteriorly to point between umbilics

From the right labium a slender pendulous mass hangs for a distance of 15 cm. Its extremity is pear shaped and 2 cm in diameter and its stalk is 2 cm in diameter. Normal skin covers the proximal half while the surface of the distal portion presents a fibrous appearance. The whole tumor swells somewhat during menstruation. It is painless but annoying because of its location. This secondary finding of fibro (lipoma?) of the labium is of some interest.

On opening the abdomen it is found that the mass on the left is the uterus containing a number of small fibroids and pushed upward entirely outside the true pelvis. The main mass instead of arising from the uterus as had been supposed, apparently takes its origin from the right ovary of which no vestige can be recognized. The right tube traverses the surface of the lower portion of the tumor which separates widely the leaves of the broad ligament on the right side and elevates the left out of the true pelvis. This space is so completely filled by the tumor that the fingers are introduced with difficulty between it and the pelvic wall on either side. On the right side the tumor has elevated the posterior parietal peritoneum to a level 2 to 3 cm above the umbilicus.

Dislocation of the mass out of the true pelvis is impossible and myomectomy offers the means of removal. This is followed by hysterectomy. Convalescence without incident.

CLINIC OF DR A R COLVIN

CITY AND COUNTY HOSPITAL ST PAUL

SOME DISABILITIES OF THE KNEE JOINT

THE knee joint presents an unusual number of interesting conditions which possessing certain symptoms common to all of them makes diagnosis at times difficult or impossible. The grouping of some of these conditions under the caption Internal Derangements seems to imply an interlocking of clinical phenomena.

Circumscribed injuries of the interior of the knee joint which has been suggested as a substitute expression for this grouping is also useful as an aid to the clinical approach.

Perhaps a combination of the two circumscribed injuries of the interior of the knee joint leading to internal derangement would broaden our conception as to the number of the conditions and at the same time emphasize the character of the symptomatology. Catching and locking of the joint always suggests to the clinician the probable nature of the condition. A number of comparatively recent experiences has demonstrated the necessity for keeping in mind the various possibilities during clinical investigation and later operative approach.

Repeated catching of the joint is common to many diseases and injuries while actual locking is confined to a limited number. Intermittent locking always suggests a recurring displacement of a semilunar cartilage. Permanent locking may result from other causes.

The sudden appearance of this phenomenon after slight trauma led in a recent case to a diagnosis of injured semilunar cartilage until a radiograph disclosed a loose body in the joint. A man of fifty five was sawing a board when he experienced

sudden pain in his knee and the joint at once became locked and remained so for three weeks. The radiograph showed not only the loose body but a defect in the mesial condyle of the femur in the location characteristic of osteochondritis dissecans (Fig. 564). On opening the joint the bone fragment which had suddenly become extruded from the articular surface of the femur was found to be attached to some strands of the posterior crucial ligament which held it anchored in such a position that extension of the joint was impossible. The patient assured me



Fig. 564.—Loose body due to osteochondritis dissecans causing locking of joint for three weeks.

that he had had no symptoms referable to his joint preceding the sudden pain and locking.

Osteochondritis dissecans besides being responsible for a large number of loose bodies in joints with their attendant symptomatology is productive of clinical manifestations prior to the extrusion of the dissected loose fragment.

The pathogenesis of osteochondritis dissecans it may be stated is up to this time not settled. The name given by König in 1887 is descriptive of a dissecting process which gradu-

ally brings about the separation of an osteocartilagenous body which appears in the joint as a loose body (joint mouse)

To the clinical acumen and pathologic knowledge of König we owe what we know of the obscure and interesting process and while not much has been added to his observations the x rays have enabled us to follow more clearly and consecutively its cause. Pain may be the only symptom complained of for several years during this period there may be neither functional disturbance nor objective evidence of trouble. Following the variable period there may be one of intermittent catchings

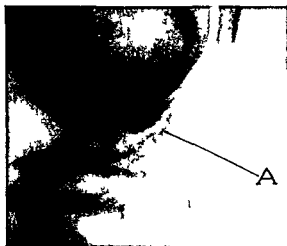


Fig 565—Osteochondritis dissecans of distal femur *in situ*

of the joint which may or may not be accompanied by joint swelling. In Fig 565 is shown at *A* a small body in a well defined oval area in the mesial condyle of the femur. This patient complained of intermittent joint catchings and pain for a number of years before the condition in Fig 565 was seen. Figure 566 is a radiograph taken six months later and shows at *A* the fragment which has been extruded from the location as shown at *A* in Fig 565.

The catching complained of might very well be confused with the catchings of a torn but not displaced semilunar cartilage.

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preceded the loosening of the dissected piece of bone. After this period movement of the joint became painful and in a short



Fig 568—Osteochondritis dissecans dissected body at A



Fig 569—Osteochondritis dissecans dissected body at A

time the symptoms characteristic of a loose body appeared and at operation the fragment was found free in the joint

Figure 569 is of the knee joint of a man sixty five years of age who complained of pain for several years and then began to have

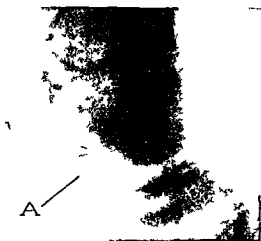


Fig 569—O t o h d t d e d t d body t A

some catchings of the joint. The fragment shown at A was removed at operation. Figures 570 and 571 are of the knee joint



Fig 570—O t h d t d d t d body t A

of a male eighteen years of age who complained of painful and swollen knee. For six years he suffered from rheumatism in this knee that is he had more or less constant pain until one

year ago when he experienced an unusual amount of pain his knee became swollen and movement painful. These acute symptoms subsided more or less and for a year he suffered only from pain again. The present condition began in the same manner as the attack a year previously; he now has uniform swelling of the joint with considerable restriction of movement. Radiographs disclosed the conditions seen in Figs 570 and 571. Experience gained from the former 2 cases seemed to indicate that because of the change in the symptoms from pain only to swelling and disturbance of function the dissected bone was becoming more detached. Six years of symptoms and the



Fig 572—The osteocartilaginous body shown in Figs 570 and 571 after removal

probability of an indefinite period of disability in the future made one advise operation although believing that the dissected piece of bone had not become extruded from its bed. On opening the joint there was found a moderate amount ofropy straw-colored fluid; the synovial membrane was much reddened. An area of the joint cartilage corresponding in size to the piece of bone and cartilage shown in Fig 573 was seen to be of a yellowish white color and was lacking in lustre; at one part of the circumference of this area a small fissure was noticeable in the cartilage and one now noticed that the entire area was very slightly bulging. Pressure on this raised surface gave one the impression that it was depressible as if resting on a cushion like bed. An

incision was now made in the cartilage on the circumference of the raised area and the piece of bone and cartilage as seen in Fig 572 was pried from its bed. In removing it one was conscious of the fact that it still remained somewhat loosely attached at its base. The surface of the bed from which it was removed was indurated, covered here and there with granulation tissue and at the center of the cavity bled quite freely. The removed fragment was thus doubly convex, covered with joint cartilage on one surface and with an irregular layer of fibrocartilage on the opposite or superior surface.

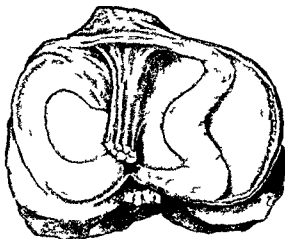


Fig 53 - Semilunar cartilage from coccyx of the patient
treated surgically of joint with

The cause of the disturbance of function including the catchings which were noticed during the dissecting period and before the fragment was extruded into the joint could be explained by the findings at operation in this last case. On removing this piece of bone with its cartilage the bed from which it was removed was covered with granulation tissue and the surface of the removed bone which fitted into this bed was covered with a layer of fibrocartilage. This increase of tissue seemed to cause a bulging of the fragment toward the joint.

cavity and this no doubt caused a painful pressure at times which felt like a catch of the joint

The final separation of these fragments seems to be brought about by a fracture of the cartilage. In none of the cases operated upon had any disease of the cartilage been found the process would be more accurately described as a dissecting osteitis. When the bone fragment has been dissected from the parent bone and is made to bulge into the joint fracture of the cartilage and a loose body results.

The symptomatology of osteochondritis dissecans may thus extend over a number of years. In all of the cases referred to except one where no symptoms were noticed until a sudden locking of the joint occurred pain was the only symptom for several years. Pain of an aching character and referred to the knee joint after a variable period of pain the function of the joint becomes impaired with swelling and limitation of movement more or less persistent or in attacks of varying severity. These attacks at first are not accompanied by characteristic catching or locking of the joint. They resemble more the clinical picture seen in villous arthritis or so called fringe joints or in the earlier stages of arthritis deformans. Finally the symptoms present the characteristic picture of a loose body.

Pain alone then is a characteristic phenomenon. There is perhaps no other diseased condition of the joints or of the bone in the immediate vicinity of the joint (for after all this condition is primarily an osteitis) that exists for the same length of time without causing any disturbance of joint function.

A diagnosis of this dissecting process having been established by radiographic study and the symptoms being of such severity that relief is demanded operative removal of the fragment is justified. This is most readily accomplished by a mesial parapatellar incision. Through this incision the articular surface of the condyle is clearly exposed to view. Either a fissure in the cartilage, a bulging area or a slight discoloration of the cartilage will disclose the diseased area and after incising the periphery of this area at any point the fragment is easily pried out to its bed.

It is quite evident that osteochondritis dis ecans at all stages of its progress may easily be confused with numerous diseases and injuries of the knee joint

Perhap the most common one is injuries of the semilunar cartilage which can be of the most diverse nature and consequently present a very variable symptomatology While the typical story of injury with locking of the joint followed by sudden release and subsequent recurrences of these phenomena seems to point positively to a lesion of the semilunars one may very easily be deceived Compare for instance the story and symptoms of the first case cited in this paper and illustrated in Fig 564 with the following

A man of thirty after a comparatively slight trauma was unable to extend his knee joint and this locking continued for three weeks On opening his joint the mesial semilunar cartilage was found torn from its coronary attachment except at its two extremities As a result of thi it projected into the joint in such a manner that the free edge of the cartilage became sharply convex toward the center of the joint (Fig 573) and this effectively prevented extension of the joint Only after detaching the two extremities was it possible to release the small projecting loop The story and symptoms in the 2 cases are almost identical

In contrast to this lesion of a semilunar was that of a young man who following an injury had repeated attacks of painful catching of his knee joint A small round movable body could be felt on the mesial side of the joint arthrotomy revealed the internal semilunar torn from the anterior half of its coronary attachment The anterior loose extremity had become formed into a rounded bulbous mass about the size of a pea (Fig 574) this was the body which could be palpated and which never led to locking of the joint In a review of the subject of injured semilunars in the *Ergebnisse der Chirurgie und Orthopadie* for 1914 illustrations from an article by Krois are shown in which are illustrated 22 different lesions of the semilunar cartilages The symptoms are consequently of the most varied nature

Jones tell us that after an experience of 500 arthrotomies he is quite prepared in cases even with classical symptoms to

find his diagnosis wrong. Quite recently an athletic young man gave a history of two severe injuries of his knee joint and subsequently had numerous catchings of the joint. While a diagnosis of injured semilunar seemed positive the symptoms were irregular enough to warrant reservation. Arthrotomy revealed normal semilunars and a fatty fringe almost 1 $\frac{1}{2}$ inches long having its origin from the infrapatellar fat pad (Fig 575). While cognizant of the fact that these fringe like bodies represent frequently the second products of arthritis due to various causes

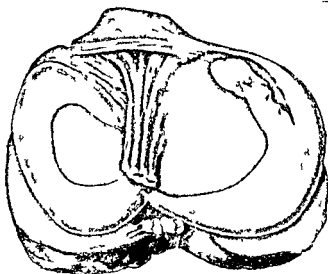


FIG 574 —Semilunar cartilage loose at anterior attachment with bulbous extremity causing only catchings

still removal of the fringe in this case has resulted in the cure of the joint disability.

So that repeated traumatic arthritis (sprain or distorsion) may lead to an inflammatory condition of the normal fatty fringes of the joint. In this case the long drawn out fatty fringe like process was quite abnormally long.

Where clinical evidence is not sufficient to warrant an exact diagnosis and the radiograph does not reveal any pathology exploration of the joint may be demanded. Unless a wide range of possibilities is kept in mind one may easily fail even by this

means to clear up the mystery. A narrow escape from failure was experienced in the following case.

A young man presented himself with a history of trauma followed by several years of catching of the joint resulting in marked effusion, pain and disability. The radiograph did not reveal any pathology. On exploration a reddened synovial membrane with a good deal of straw colored fluid was found. Another finding which in the light of added experience seems of

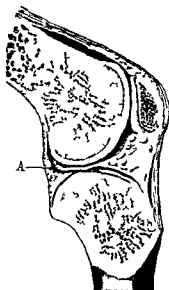


Fig 575—F g l k p o c e e x t e d g f o m f a p t l l f t p d c s g
c a t l g f j t

value in explorations was the presence of minute particles of cartilage in the synovial fluid and of minute implants of cartilage on the synovial membrane. When these are found they are suggestive of an injury to the hyaline articular cartilage. I have found this condition in joints the subject of a loose body due to osteochondritis dissecans.

In the case now being discussed the semilunar cartilages were normal and nothing abnormal could be seen except the items quoted above. Rather extensive digital exploration did not

discover anything and finally by bimanual exploration one hand pressing from the outside an indefinite sense of contact of something movable was made with the examining finger in the joint. Continued pressure with the outside hand made it possible finally to demonstrate and remove a piece of cartilage about the



FIG. 576.—Loose piece of hyaline cartilage from articular surface of femur causing catching of joint.

size of a thumb nail which conformed in contour and thickness to the articular cartilage of the condyle of the femur (Fig. 576).

Inasmuch as a loose body of this character is not seen in the radiograph and as preoperative diagnosis may be impossible thorough digital exploration of the joint may be necessary even if one does it reluctantly.

INFECTED FRACTURE OF THE BASE OF THE SKULL

IT is difficult to state with accuracy the percentage of recoveries in fractures of the base of the skull. Many of them of course are of such gravity that death ensues very quickly. The remainder however that are still seriously injured furnish a large proportion of recoveries.

The extent of the fracture in cases that recover cannot of course be accurately determined.

Rawlings cites a case of fracture of the base in a boy of fifteen who when first seen was collapsed and pulseless and bleeding from both ears, the nose and mouth, both tympanic membranes were lacerated, facial paralysis on one side developed. One pupil widely dilated and one contracted to a pin point, marked internal strabismus of one eye. The boy made a rapid recovery. He speaks of this as the typical basal fracture *i. e.* passing from one auditory meatus to the other involving both middle ears and the sphenoidal sinus in the middle line, the line of fracture passing just in front of the genu of one facial nerve thence forward to the sphenoidal fissure and across the dorsum sellæ.

The following case while evidently following closely the lines of fracture described by Rawlings was even more extensive and being complicated by infection recovery under these circumstances being rather remarkable.

A boy of sixteen was brought to the City and County Hospital July 17th in a semiconscious condition. During the examination a short time after his admission he became very irritable. He was bleeding from both ears and from his nose and there was a paresis of the left facial muscles. He regained consciousness several hours after his admission and on July 9th said he was all right. His temperature which rose to $100\frac{1}{2}^{\circ}$ F the evening of his admission fell to normal the next morning remaining so

until July 21st when there was a gradual rise reaching 104 F on the 22d falling then to 99½ F reaching 100½ F on the 23d becoming normal on the 24th to rise again to 104 F on the 25th. On the 20th he complained of pain in his left eye. A note was made at this time that his pupils were unequal the left being the larger. From this time on he complained of headache. Pus was found running from his left ear and marked tenderness was elicited over the mastoid process. On July 26th the usual incision for dealing with mastoid suppuration was made this exposed a fracture running horizontally across the mastoid process the mastoid cells contained pus as did the antrum. After the ordinary complete mastoid procedure attention was again directed to the fracture and it was found that this followed closely the groove for the lateral sinus in the bone. Clotted blood was found between the sinus and the bone. The fact that *ordinary uncomplicated mastoid suppuration is not usually attended by as high a temperature as we had in this case (104 F)* made one suspicious of further trouble. Although the temperature was high the patient was mentally clear except that he seemed a little dull on account of pain. The sinus appeared normal and although sinus phlebitis could not be excluded it seemed best before considering the advisability of exploring the sinus to investigate the further course of the fracture as far as accessible.

Extending the incision at right angles to the mastoid incision the fracture was traced posteriorly to the midline behind. The suspected infection of the line of fracture was however not found. Because of the facial paresis it was suspected that the fracture involved the region of the aqueductus fallopi and if so that it probably involved also the posterior surface of the petrous portion. Still suspecting an infection of the line of fracture it was decided to gain access to the extradural space on the posterior surface of the petrous portion. To do this an opening through the bone was made internal to and above the sigmoid sinus and external to the internal auditory meatus and pus between the dura and the bone liberated.

After the operation the temperature returned slowly to

normal occasionally rising to 100°F as late as August 16th. Except for this his convalescence was undisturbed the discharge from the middle ear also ceasing.

The fact that he was on admission bleeding from both ears and from his nose would make it seem probable that the fracture extended from the middle line behind (where it was exposed during the operation) across the base of the skull to the right petrous portion.

The routes of infection from the middle ear and mastoid are pretty well established. Extradural pus is usually found over the tegmen of the tympanum or intrum or in the sigmoid groove in the usual mastoid infections. In fractures of the base complicated by rupture of the tympanic membrane infection from the tympanic cavity and mastoid cells would follow the same route. Another less common situation for pus is that described in the operative report of this case. Here however the route of infection was that of the fracture. The fracture line continuing from this point backward was not infected but in all probability it would very soon have become so.

There is room for differences of opinion as to when mastoiditis occurring in the course of ordinary middle ear suppuration should be operated upon and as to whether certain cases may not recover without surgical interferences but in basal fractures complicated by middle ear suppuration with the added avenue of fracture for infection of the interior of the skull doubt should be dispelled by exploration as soon as symptoms pointing to probable infection of the bone supervenes.

There is no more satisfactory operation in surgery than that for mastoid suppuration. The successful surgery of the complications extradural abscess and sinus thrombosis are comparatively common. The symptoms of these complications would not differ in infected fractures from the same complications occurring in ordinary mastoid suppuration and should be as satisfactorily dealt with.

Von Bergmann reports 2 cases of infected fracture of the base both successfully dealt with one two weeks the other twenty one days after the injury. In one he opened an extradural

abscess through the tegmen of the antrum in the other he merely drained the mastoid process both recovered

Although purulent leptomeningitis would be most likely to occur early from fractures complicated by an escape of cerebrospinal fluid occurring later it may arise from a pre-existing extradural abscess and as we have seen these in the mastoid region can be successfully dealt with

Whether in basal fractures an extradural abscess over the cribriform plate of the ethmoid due to infection from the nasal cavities could be diagnosed early enough to be successfully evacuated is problematic

Von Bergmann reports an autopsy where death occurred two weeks after the fracture from meningitis due to the *Diplococcus pneumoniae*. Extradural pus was found in this region

Although the following case does not come under the category of basal fractures as usually spoken of it poses some points of interest relative to infections at the base of the skull

A woman aged forty was admitted to the City and County Hospital March 21 1915 for gunshot wound of the head. The bullet .32 caliber had entered the left nares leaving only some powder marks and a slight laceration of the tip of the nose. She complained of pain in the head and face and in the back of the neck. Her temperature which was subnormal on admission was normal the next day and remained so for five days during these five days she complained very little of pain. On the sixth day the temperature rose to 103° F and she suffered a great deal of pain in the head the temperature remaining at 103° F. On the seventh day operative interference was decided upon. The radiograph of the head (Fig. 577) showed the bullet at the level of the superior border of the petrous portion of the temporal bone as well as the general course taken by the bullet as indicated by lead particles. From this information it seemed as if the bullet could only have entered the cranial cavity through the great wing of the sphenoid on the interior of the skull the space included between the sphenoidal fissure above the anterior branch of the middle meningeal artery laterally the carotid

artery mesially and the foramen spinosum and oval behind was most likely the area of entrance

This area could be reached only from an opening in the temporoparietal region above the zygoma. An osteoplastic flap was made and the dura separated from the bone to the base here some loose bone fragments were felt and removed. An opening in the dura could also be made out and with a hook



Fig 577

shaped director inserted through this opening the dura was incised as near the base as possible the finger inserted down to the tip of the temporosphenoidal lobe and an abscess in this lobe opened the bullet could not be felt drainage was inserted to the region of the abscess

The patient made an uninterrupted recovery the temperature reaching normal on the third day after the operation and remaining normal thereafter. She left the hospital on the

eighteenth day after the operation and has remained well for the ensuing eight years except that she had a cholecystectomy performed one year after the head injury

She now suffers neither pain nor any inconvenience from the bullet which remains in the same region where the radiograph showed it at the time of the injury



CLINIC OF DR WALLACE H COLE

MILLER HOSPITAL CLINIC ST PAUL

ASTRAGALECTOMY AND BACKWARD DISPLACEMENT OF THE FOOT FOR TALIPES CALCANEUS DUE TO INFANTILE PARALYSIS OPERATION AND DEMONSTRATION OF CASES SHOWING AFTER TREATMENT AND RESULTS

Case I—This first case is a girl fifteen years old who gives a history of infantile paralysis when two years of age. The residual paralysis was confined to the left leg and foot and although the patient has always had difficulty in walking no treatment has ever been undertaken. The examination on admission to the hospital showed a typical talipes calcaneus deformity of the foot and only the heel touched the floor when the patient walked (Figs 578 579). The muscles of the thigh were all acting strongly as were also the peroneal muscles and to a lesser extent the extensor longus digitorum. The other muscles of the leg and foot were paralyzed. There seemed to be little doubt that astragalectomy was the treatment of choice and this operation will now be performed. When Whitman first devised this procedure it was recommended for cases of calcaneus only but since that time it has gradually widened its scope until at the present time the operation is also recognized for its usefulness in the treatment of flail feet and the varus and valgus deformities where the paralysis is too wide spread to allow tendon transplantation. Joint and tendon fixation although useful in certain cases of paralysis should never be used in calcaneus as the results obtained are in no way comparable to what we may expect from astragalectomy.

The operation will be performed with a tourniquet applied to the mid thigh. In order to get rid of as much congestion in

the limb as possible it is elevated to the vertical position for a few minutes and then the first turn of the tourniquet is applied quickly in order to shut off the arterial supply at practically the



Fig 58 —P l t l n e s b e f o r e p r t o n L t e l v

same instant as the venous return. If the compression is applied slowly the superficial veins are shut off first and the blood keeps



Fig 59 —P l t c l s b e f p e t o A t v i

flowing into the leg until the moment when the artery is finally closed. A congestion of the leg distal to the tourniquet thus results and an annoying venous bleeding could be expected

during the first part of the operation. The skin of the leg and foot is prepared by the usual iodine method and a small gauze sponge is folded over the toes as an additional safeguard. This is held in place by an ordinary heavy rubber band.

The incision runs from a point half way between the tendo achillis and the lateral malleolus and about 1 inch above the

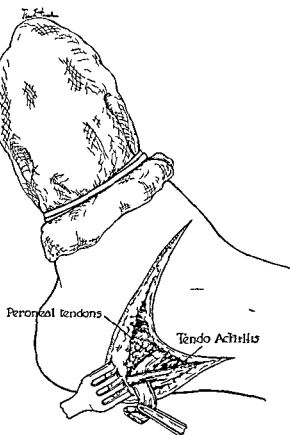


Fig 580—Peroneal tendo passed through Achilles tendon in first stage of astragalectomy

level of the tip of the latter down around the malleolus and forward on the dorsum of the foot to the head of the astragalus. The peroneal tendons are picked up and divided well forward and freed to the upper angle of the wound. The tendo achillis is now exposed and a slit cut in it near its base through which the freed ends of the peroneal tendons are passed. An artery forceps will keep them from slipping out again (Fig 580). I

have found it easier and quicker to do this part of the tendon transplantation at this time rather than at the later time usually recommended. The lateral and interosseous ligaments are now cut and the head of the astragalus is freed as much as possible. The foot can now be forcibly inverted until the sole is pointing toward the body and the astragalus is easily removed by cutting the attachments on the medial side. Both malleoli are freed from all ligamentous structures and the posterior lip and

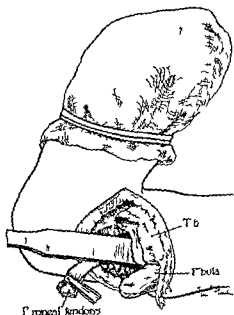


Fig 581.—Free g f l w r d f t b and f b u l a n a t g a l t y

surface of the lower end of the tibia also cleared by passing an osteotome up back of them (Fig 581). If this part of the operation is not completely performed it will be impossible to obtain the desired amount of posterior dislocation of the foot which we will want in a few minutes. Pockets are now prepared for the freed malleoli on either side of the tarsus. On the medial side we free the soft tissues from the scaphoid with a sharp Olber raspatory and on the lateral side a thin layer of bone is cut from the adjoining surfaces of the os calcis and the cuboid

The inner surfaces of the malleoli are reshaped with a thin sharp osteotome so that they will fit well into the pockets prepared when the foot is dislocated backward. The lateral malleolus is very thick in this case and we will therefore remove a portion of its outer surface. The foot is now dislocated and the malleoli fitted into the pockets and in order to hold them there and prevent the dislocation from being reduced during the closing of the wound and the application of the plaster a mattress suture of heavy chromic catgut is inserted uniting the flap removed from the cuboid and the os calcis with the structures on the outer side of the lateral malleolus. The peroneal tendons are then drawn taut and fastened to the Achilles tendon with a series of interrupted chromic catgut sutures. The deep and superficial tissues are closed with plain catgut and a subcuticular stitch of No. 00 chromic catgut closes the skin. No gauze dressing is placed over the wound but the foot and leg are wrapped with several layers of sterile sheet wadding and then a plaster of Paris dressing is applied extending from the toes to the mid thigh with the foot in the position of slight plantar flexion and abduction and the knee at a right angle. The plaster being all applied we now remove the tourniquet. This leg will be suspended over the bed from a frame in order to prevent congestion and make recovery from the operation less painful.

Case II—This patient was operated upon one week ago and had an astragalectomy performed in the same way as the case just finished. She is being shown in order to demonstrate the first stage in the after treatment following such an operation. The leg in the postoperative plaster is suspended by bandages from a simple overhead frame and you will notice that there is no swelling or congestion of the toes and that the child can move around in bed without discomfort (Fig. 582).

Case III—This next girl shows us what the first step in the ambulatory after treatment of astragalectomy consists of. At the end of three weeks from the time of operation the overhead slings are dispensed with and the plaster dressing removed. At this time it is my custom to take a lateral x ray of the foot

to check up on the displacement and the film of this case shows as you can see a good displacement (Fig 583) A model of the foot is taken immediately and then a walking plaster with a



Fig 582 — P t p r t fixat n f t g l e t m y

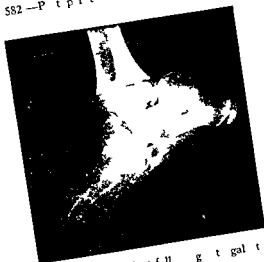


Fig 583 — x Ray f foot f ll g t gal t my

heavy wedge shaped sole applied and the patient encouraged to walk. This child was operated upon about four weeks and has only just had the walking plaster put on (Figs 582 and 583).



Fig. 584 —Walking plaster used after astraglectomy. Anterior view



Fig. 585 —Walking plaster used after astraglectomy. Lateral view



Fig. 586 —Model of foot over which leather anklet is made following astraglectomy. Lateral view

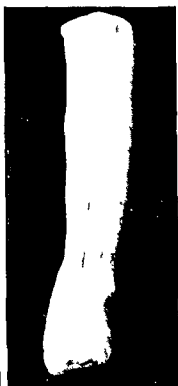


Fig. 587 —Model of foot over which leather anklet is made following astraglectomy. Anterior view

The plaster model over which the walking brace will be made shows you the appearance of the foot when the plaster was changed (Figs 586-587)

Case IV—An astragalectomy was performed on this patient three months ago and we can see not only the result of the operation but also the brace which has been worn for the last month. You will notice how stable the foot is and how the weight bearing line is all that we can desire (Figs 588-590)



Fig 588—Postoperative astragalectomy of the calcaneus. Anterior view



Fig 589—Postoperative astragalectomy of the calcaneus. Lateral view

The brace which we use is a molded leather anklet with an inverted Y shaped steel running down the back and on to either side. A wedge of cork is incorporated in the brace under the heel to keep the foot in the proper position and to make up partly for the shortening (Figs 591-592). Usually on account of the atrophy of the paralyzed foot the shoe will fit over the brace without much trouble although the upper part may have to be remodeled in order to fit neatly. Such a brace is worn for from six to nine months and then if stability has been obtained a cork left in the shoe under the heel is all that is needed and this only to make up for the shortening.



Fig 590 —Postoperative astragalectomy for calcaneus Medial view



Fig 591 —Patient wearing the leather ankle brace after astragalectomy Anterior view



Fig 592 —Patient wearing the leather ankle brace after astragalectomy Lateral view

OPERATION FOR RECURRENT TUMOR OF THE PATELLA THE DIAGNOSIS AT THE TIME OF THE FIRST OPERA TION WAS BONE CYST RESECTION OF THE LOWER HALF OF THE PATELLA

Case V—This patient a woman thirty two years of age was first seen about fifteen months ago. She complained at that time of a painful left knee of ten months duration and examination showed only an inability to actively extend the knee beyond 160 degrees and a tenderness over the lower part of the patella. The x ray however showed a rarefied and



Fig 593—Cyst of patella

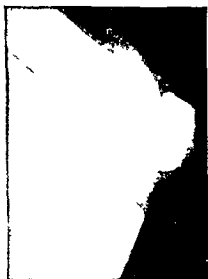


Fig 594—Cyst of patella three months after operation

cystic condition of the distal half of the patella which was diagnosed as either a giant celled tumor or a bone cyst (Fig 593). Two months later the patella was explored and a cavity containing clear fluid was found the walls of which had the appearance of granulation tissue. At one point in the posterior wall of the cavity there was a perforation into the joint. The cavity was

thoroughly curetted out and cauterized with pure carbolic acid. Healing occurred promptly. The pathologic diagnosis was benign bone cyst and this was concurred in by Dr. Bloodgood who examined the x-rays and the tissue. The repeated x-ray examinations during the months following the operation seemed to show the cavity filling in with bone and the condition three months later is shown in this film (Fig. 594). Four months from this time we were greatly surprised to find a recurrence of the cystic condition and from that time to this seven months there has been a gradual increase in the process. This film taken a



Fig. 595—Cyst of patella. R. After one year.

few days ago shows the present x-ray findings and there is apparently a projection of the bony and tumor tissue into the joint (Fig. 595). What the character of this growth is is problematical but everything points to its being benign.

The operation will be performed under a tourniquet as we do not want bleeding to interfere with the complete removal of the tumor mass. The curved incision around the bottom of the patella is carried down to the tendon and then the tendon itself is split longitudinally and separated from the anterior surface of the patella but no signs of pathology are seen even

with this complete exposure. With a small chisel the lower part of the anterior wall of the patella is removed and we are now in the cavity shown in the x ray. You will see that it is almost filled with a gray granulation tissue like substance which is evidently the tumor. There is no infiltration of the soft parts and we can apparently completely remove it. The whole lower half of the bone being involved it is resected and the curet

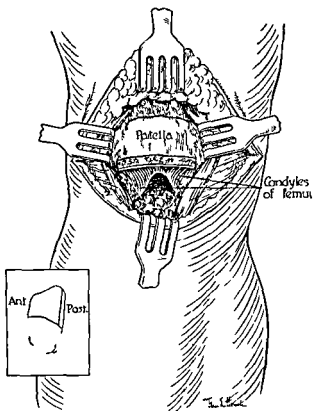


Fig 596—Operative removal of lower half of patella

used to smooth off the upper fragment which consists of very dense bone. The knee joint cavity is widely exposed by this procedure (Fig 596). Pure carbolic is now used to cauterize the raw bone surface and then neutralized with alcohol. The two halves of the tendon are now drawn together with mattress sutures of heavy chromic catgut and these longitudinal slits on either side allow a better approximation although there is still a definite cavity between the tendon and the joint. When

we consider the excellent function obtained in the fractures of the patella even with a considerable separation of the fragments there seems to be no reason why a useful knee will not be obtained in this case. You notice that no splint has been applied to the knee but that enough immobilization is obtained by means of a large dressing reinforced with a thick layer of cotton. Movement of the joint will be encouraged as soon as possible.

The treatment of bone tumors cannot be discussed at any length here but the principle we follow even in definitely malignant cases is to excise locally if entire removal of the growth can be obtained in this way. With benign cyst simple curetting or removal of the lining membrane is all that is necessary except where mechanical reasons make excision advisable as in this case. I am reasonably sure that all the tumor has been removed in this case and even without the microscopic diagnosis we can hope for cure.

NOTE --The sections of the tissue run through celloidin showed nothing but granulation tissue and the probability is that due to poor bone regeneration a granulomatous mass formed in the cavity of the cyst and invaded the knee joint cavity through the perforation mentioned. Further studies will be necessary and this case will be reported fully later.

CHRONIC SUBACROMIAL BURSITIS WITH CALCIFICATION SURPRISING RESULT FOLLOWS MANIPULATION DURING ACUTE EXACERBATION DEMONSTRATION OF PATIENT AND x RAY FILMS

Case VI—This patient an active professional man was first examined about eighteen months ago at which time he complained of a painful left shoulder. The findings were very typical of a chronic subacromial bursitis and an x ray showed a moderate amount of calcification apparently in the supraspinatus tendon (Fig 597). The symptoms lessened markedly



Fig 597—Calcification in subacromial bursa

under light exercises and only at times was there any real discomfort. One year later another x ray was taken and the calcification had slightly increased as is shown in this film (Fig 598). Five months after this following an evening of dancing the shoulder became acutely painful and it was impossible for the patient to continue at his work. There was a definite swelling over the region of the bursa but aspiration failed to

reveal any fluid. Tenderness was very marked and the slightest movement caused excruciating pain. This film was taken and it shows the calcification probably slightly increased (Fig. 599). Under gas oxygen anesthesia the arm was abducted to the vertical position without the use of any force whatever being necessary. The pain following this manipulation was so intense that the arm had to be lowered a few hours later and for the next few days large doses of morphin had to be given at frequent intervals. Hot packs were used almost constantly and seemed to give some relief. Fifteen days from the onset of this acute



Fig. 598—Calcification in subacromial bursa.

Fig. 599—Calcification in subacromial bursa following manipulation.

attack the patient was able to resume his occupation and another x-ray was taken when it was found that a large part of the calcification had disappeared (Fig. 600). The acute inflammation and the manipulation were probably the cause of this absorption. Today two months later the x-ray shows further absorption (Fig. 601).

On examining the patient the atrophy of the muscles of the shoulder girdle is very apparent although for six weeks the arm has been used fairly freely. Abduction can be performed for about 75 degrees but the lifting of the arm above this point is

accomplished only by tilting of the shoulders as you can see. The rotations are also still limited in the extremes and attempts to force them or the abduction causes some discomfort in the region of the bursa. There is only a slight amount of tenderness on pressure over the bursa.

The one point that I wish to bring out in this case is the peculiar action of the calcification. The case was observed for over a year and during that time the calcification had increased

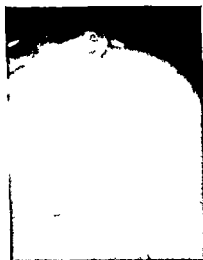


Fig. 600—Shows disappearance of calcification after manipulation. Taken two weeks after Fig. 599.



Fig. 601—Condition two months after manipulation.

to a very definite extent. An acute flare up at the end of that time caused a remarkable absorption of the calcified areas and this process is continuing. It is well known that bursal calcification will frequently clear up spontaneously, but to see such a rapid reversal of the process is rather unusual. It also seems that the placing of the arm in abduction when calcification is present is contraindicated as the mechanical irritation caused by the mass passing under the acromion may be very severe.

MANIPULATION OF SHOULDER FOR ADHESIONS FOLLOWING DISLOCATION CAUSE OF SUCH ADHESIONS PROBABLE PATHOLOGY METHOD OF BREAKING UP AND THE AFTER TREATMENT

Case VII —This patient a man fifty two years old dislocated his right shoulder four and a half months ago. The arm was held at the side for over five weeks and since that time he has been unable to work on account of the pain and stiffness. Active massage and manipulations have been used without much benefit and the range of motion has not increased for the last few months. Our examination showed some atrophy of the muscles of the shoulder girdle and a rather marked limitation of the motions of the shoulder joint. Abduction was possible for 65 degrees and passively could not be forced much above this point. There was no tenderness and the x ray examination was negative. The condition today is the same.

A diagnosis of periarticular adhesions has been made and we will attempt to break them down under gas oxygen anesthesia but will have to change to ether if relaxation cannot be obtained. Although this condition is probably mainly periarticular there certainly are some adhesions to be found between the dependent folds of the synovial membrane as has been pointed out by Thomas. Following any severe injury to the shoulder where there is more or less hemorrhage and articular and periarticular effusion and infiltration there is certain to be some organization later and this will limit motion in the joint unless early steps are taken to prevent the tying down.

With this in mind we should always start motions as early as possible after any such injury. The indication for our treatment at the present time is the fact that even with massage and passive stretching there has been no improvement in the range of motion. There are two dangers to be guarded against in this forcible manipulation and they are fracture of the neck of the

humerus and dislocation of the shoulder joint. The object of the manipulation is to break up all adhesions which have formed in and around the joint and thus free the parts for their full range of motion.

This procedure can be performed by the operator alone but if possible two assistants should be used. We will have one assistant encircle the chest with his arms the hands being clasped in the axilla so as to hold the capula to the side and the other place his fist in the axilla to prevent dislocation and support the humerus. The arm is now slowly abducted and you can hear the snapping of the adhesions and we who are holding the patient can feel more giving way than can be heard. The scapula is allowed some motion after the arm starts above a right angle and the normal range of abduction is obtained as we can see by comparison with the opposite shoulder. The elbow is flexed and by using the forearm as a lever the full range of internal and external rotation is accomplished with the tearing of further adhesions. The assistants now release all support and the shoulder is moved through its complete range. The arm will be held in complete abduction while the patient is taken to his bed and it and the hand will be tied to the head of the bed for twenty-four hours. Active motion will then be instituted and the patient made to move the shoulder many times a day to the extremes of all position. Physiotherapy will also be used to hurry recovery and there is no reason why the adhesions should reform if this after treatment is followed.

AMPUTATION FOR OLD ANKYLOSIS OF THE KNEE DUE TO TUBERCULOSIS IN INFANCY WITH DEMONSTRATION OF TEMPORARY ARTIFICIAL LEG WITH PLASTER OF PARIS SOCKET

Case VIII—A girl eighteen years old who came to the hospital desiring amputation on account of the disability caused by an ankylosed knee at the right angled position with a marked shortening of the extremity and paralysis of the muscles of the leg and foot. The active disease had started when the patient



Fig 602 —Old ankylosis of knee due to tuberculosis in infancy



Fig 603 —x Ray of old ankylosis of knee due to tuberculosis in infancy

was two years old and for many years following this there were discharging sinuses around the joint which ultimately healed up but left deep scarring and a stiff knee. Examination showed a condition which is best understood by looking at this photograph taken on admission (Fig 602) and this x ray film taken at the same time (Fig 603). You will notice that there is an

absolute bony ankylosis with the formation of a medullary cavity through the region of the old knee joint. It is only when you see a picture similar to this showing the bone striæ running between the two bones and the medullary cavity of one bone continuous with that of the other that a definite x ray diagnosis of bony ankylosis can be made. The muscles of the leg were completely paralyzed and as a result the foot was flail. On account of the marked shortening and the paralysis amputation was performed about seven weeks ago. The oblique method of



Fig. 604.—Patient with right amputation of the leg with plaster of Paris cast. Six weeks after amputation.

Kocher was used with the flap on the medial aspect of the thigh as by this procedure the old sinus tracts were not disturbed. Absolutely no muscle tissue was seen during the operation and the entire flap consisted of fat and fascia only. Healing was uneventful and after the stitches were removed on the tenth day compression bandages were applied to accelerate the shrinkage of the stump. On account of the position in which the thigh had been held for so many years there was a permanent flexion of the hip to the degree shown in the picture and as soon as the

tenderness following the operation had subsided sand bags were placed on the stump to stretch the contractures This was followed by daily manipulation in the Physiotherapeutic Department as soon as such treatment could be borne by the patient In six weeks a temporary artificial leg was made and you see the girl walking around on it today with perfect comfort (Fig 604) The importance of the early use of such an appliance cannot be too strongly emphasized and where the stump is freely movable and no contractures have to be overcome many cases can be walking around in less than a month from the time of operation The making of these temporary artificial legs is not difficult and the detail of the technic can be found in an article by Wilson in the Journal of Bone and Joint Surgery for April 1922

CLINIC OF DR HARRY P RITCHIE

UNIVERSITY HOSPITAL MINNEAPOLIS

SOME USES OF THE DERMAL GRAFT AND THE DELAYED FLAP

THE literature of surgery has been involved for many years in the discussion of major conditions and quite properly as many of the questions and procedures are still unsettled. During this time plastic surgery has assumed a minor role and has been neglected except by the few until the great need of thoughtful and expert work arose during the war. In recent years there have been very encouraging signs of a revival of interest while papers presenting some feature of reconstructive work are appearing frequently. Revival is the proper word since most of the accepted steps were suggested many years ago. But it is a revival only in this sense that while many general and specific details are age old they are now being discussed on a higher plane than ever before and many questions are presented in a new light. A more direct application of the principles of surgery, a selection of operation for the case and an exact and intimate study of the individual are signs of healthy progress.

The work and teachings of Gilles Blair and Davis and of many others have stimulated thought and attention to this feature of surgery.

There is an ever increasing field for this specialty namely in the injuries of civil practice the traumatism of industrial work and the gross malignancies about the head and neck. It is necessary to show results not only from a cosmetic standpoint but for the yield in functional increase. Much of this surgery depends on the consent of the patient in our civil practice or the consent of responsible parties in our industrial

work. Failures result in an economic loss which if frequent discourage every one concerned. The point is that proper results can be obtained by careful but never by haphazard surgery.

There are two procedures the application of which have been so startling in their results and of such general application that they are the most interesting features of this work. They are the dermal graft and the delayed flap.

The dermal graft or the Woulfe skin graft is described as a *full thickness or whole skin graft*. The two latter terms may be misinterpreted to mean the skin and underlying tissue leading to the transference of uncleaned skin which invites failure and leads this graft into disrepute. We should therefore select and adopt a positive descriptive term for common use and the dermal graft has been suggested.

The Thiersch graft is of such universal use either for clean or granulative surfaces that it is almost synonymous with the term skin graft. It is an epidermal graft.

There was a debate as to whether the Reverdin graft was an epidermal or dermal graft. As far as my experience goes it makes no difference which it is but with the other two we should make definite distinctions as indicated in the descriptive terms.

I The Dermal Graft—(a) It may be cut to pattern size or form does not matter.

(b) It requires a fixed base as pressure is an essential principle.

(c) The graft and the area applied must be clean and dry.

Two things may happen to this graft.

1 *Necrosis*—This looks like a clean death or a dry gangrene not always over the whole graft although it may be. But if an attempt is made to remove this graft before ten days or two weeks it will be impossible to do so without tearing it off. In 3 cases 2 of which I show there are left only small areas of granulation. The very under surface adhered and while these 2 cases are listed as partial failures we found that it acted as a wonderful dressing albeit a rather expensive one and that both surfaces yielded to a follow up epidermal graft. In these 3 cases

grafts were placed on movable bases—one on the axilla and on the chest wall and the other on the inner surface of the elbow

2 *Superficial Infection*—This comes as a small vesicle which extends serpigiously. I first thought that it was a pressure necrosis but those more experienced have informed me that it is an infection which responds promptly to a mild silver nitrate application

II *The Delayed Flap*—This flap is based on well proven principles and experience and may be used in several ways

(a) It may be cut on its pedicle and then replaced in its original bed for ten days or two weeks. This procedure owes its importance to the fact that it admits of cutting a narrow pedicle to a wide or rounded flap. The vessels thrombose the inflammatory reaction becomes quiet and it recovers comfortably in its own bed

(b) The flap may be raised and left attached at both ends. This allows the area from which it is raised to heal. One end is later detached and swung from the other end as a pedicle. It is particularly applicable where body and cushion are required in the immediate vicinity of the flap

(c) The flap may be raised and left attached at both ends. Later one end is detached and sewn to another area with a view of jumping the flap

All of these plans have uses and are especially valuable where it is necessary to transfer skin with the underlying tissues and make up defects which require body in their reconstruction. It is possible to use both the dermal graft and the delayed flap to advantage in the same case

Most of the cases were treated with the advice and assistance of Drs A MacLaren and L E Daugherty in my private practice and of Dr A S Strachauer and Dr A A Law in my public teaching service at the University Hospital

A *Contractures About the Neck*—Case I—Figure 60s shows the use of the single flap cut along the lines indicated in the picture and left attached at both ends. In two weeks the contracture is dissected out and the lower end of the flap is cut transferred and sutured in place. The difficulty is in estimating

the extent and form of the denuded area. The flap may not always fit. Of course it is possible to transfer the flap immediately but the danger of this procedure is that the blood supply at the lower end may be interfered with. This



Fig 60 —Case I



Fig 606 —Case II

single flap may be cut from the back and transferred with the base at the neck.

Case II —Figure 606 shows the use of the same type of flap taken from both sides with the plan of making the transfer after the form of a cravat. In this case the flap is taken from the left shoulder and right chest respectively.

Figure 607 shows the end result. Occasionally in the use of flaps a web along one or the other of the suture lines forms as shown in the picture. This can easily be dissected out. The flaps are applicable where the contractures are limited to the neck tissues only.

Case III —Figure 608 illustrates a different problem. While in the first and second cases the chin was not involved in the third case it will be observed that the chin is gone and the mucous membrane of the lower lip is so everted as to reach below the clavicle. After consultation with Dr MacLaren I decided to try the dermal graft. The contracture was dissected up in order to loosen the chin freely. The graft was then taken from the left abdomen and sewn into the wound, the size and extent of which is shown in the picture in Fig 609. A starch bandage



Fig 607 —Case II



Fig 608 —Case III

and gauze pressure was applied in the effort to give positive contact with the base tissues.

Figure 609 shows that wherever positive pressure was obtained the graft took. Half way between the mentum and the mucocutaneous border of the lower lip is shown the upper margin of the graft. This was a complete take throughout one half of the area shown. The lower half where it was difficult to obtain pressure failed, undergoing a type of necrosis mentioned in the first part of the paper.

The next step was the dissection and loosening up and inversion of the lower lip which left a denuded area on the upper part of the chin. A crescentic dermal graft was then taken and placed in this area with a complete take.

Figure 610 shows the result although the picture does not fairly illustrate it as she can completely hide the mucous membrane of the lower lip. The lower part of the chest has been covered by an epidermal graft.



Fig 609—Case III



Fig 610—Case III

Case IV—This shows repair following an operation for malignancy. This case had had various preoperative diagnoses made but was proved to be a carcinoma. It had been operated upon and subjected to radium, how efficiently I do not know. Figure 611 shows the condition when the patient came under my care. The operation was performed by the thermocautery method which in Fig 612 shows the result of a complete unilateral neck dissection removing the submental, submaxillary, salivary and anterior carotid chain of lymph glands with exposure of the ramus leaving an enormous defect. This area was skinized. In ten days the area was measured and a pattern



Fig 611—Case IV



Fig 612—Case IV

made and transferred to the lower neck. A flap was then outlined with the base below the ear. The flap was raised, all bleeding surfaces caught, the flap replaced and sewn in its

own bed. In ten days the stitches were removed and the flap transferred to a granulating surface. At the same time the denuded area was covered with an epidermal graft. Figure 613 was taken soon after the removal of the dressing. There was still some discharge on the flap which makes it look as though there was a failure of union, but the flap did take. This shows that a flap cut to pattern with a narrow pedicle may be successful even on granulating surfaces.



Fig. 613 —Case IV

It is my experience with the thermocautery that wherever a bone is denuded a sequestrum may be expected within any period up to six months, and in this case in four months a 2 inch piece of bone was removed.

B Contractures About the Axilla —Case V —If limitation of motion is due to web, this may be taken care of by making the incisions in different planes on the anterior and posterior surfaces and connecting the incisions by dissecting it. This plan is shown most graphically in former numbers of these clinics by Dr. E. Wyllis Andrew.

When the contracture is due to a distinct keloid there is no opportunity for carrying out this procedure. In the case as

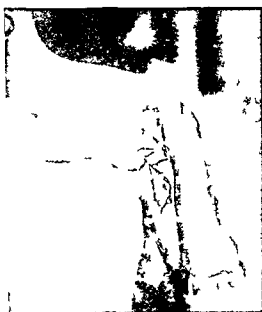


Fig 614—Case V

shown in Fig 614 a linear flap was cut from the arm left attached at both ends and protected by gutta percha tissue in an effort to prevent tubulization. In ten days the keloid was excised



F g 615—Case V

and the flap transferred as shown in Fig 615. The result of this procedure was that a thin web contracture formed on

the lower suture line as shown in Fig. 616 so that his abduction was about 45 degrees. This contracture was then removed and the arm placed in full abduction. This left a raw area on the arm upon which a dermal graft was placed with a complete take. The end result on this man is that he can raise the arm to full extension above the head.



Fig. 616—Case V

Case VI—Figure 617 shows an extreme burn of the chest and arm involving the axilla. The extreme abduction is shown. The area on the arm shows the result of an epidermal graft extending from the axilla to below the elbow joint. I could not plan any flap as the contracture of the axilla was keloid and involved the anterior and posterior margins. After dissection the arm was raised into a position of complete abduction. There was one unburned area of skin in the apex of the axilla and this was transferred by a pedicle flap to the arm and he now has hair growing on the arm at least 4 inches from the central point of the axilla. A dermal graft was cut from the abdomen and sewn into the wound. In ten days there was a complete necrosis



Fig 617 - Case VI



F g 618 -Case VI

It was practically impossible to obtain constant pressure. The surface left after the removal of the dermal graft was beautifully clean, therefore an epidermal graft was applied and held in place by a mold of dental wax with a take as shown in Fig 618. This is a rather roundabout way to obtain results. This case raises the question as to the division of credit between healing in extension and the effect of the graft.

C. A Combination Use of the Dermal Graft and the Delayed Flap—Case VII—Figure 619 shows the casts of the right and



Fig 619—Case VII

left ears of a three year-old boy. The right ear illustrates the usual form of microtia. The plan followed was this:

A pattern was cut to fit as nearly as possible the left ear principally to get the aggregate area of the front and back. This was reverted and transferred to the cast of the deformed ear. The child was then etherized and a flap cut according to this pattern except that it was made square as shown in Fig 620. This flap was then lifted up, all surfaces dried, and replaced in its own bed and sewn in place. In two weeks the stitches were removed, the flap raised and folded as shown in Fig 620. The envelope thus was held in place by three $\frac{1}{2}$ inch mattress sutures threaded through a piece of fine catheter, thus giving a

fixed contact at the base of the envelope. The cut margins above and below were approximated by single sutures. A



Fig 620 —Case VII



Fig 621 —Case VII

dermal graft was cut from the left abdomen and sewn into the denuded area resulting from the elevation of the delayed flap. The posterior cut margin was sewn to the anterior cut margin.

of the graft with what to me is an astonishing result of a clean primary union of two transferred tissues. The dark area in Fig. 620 is an exhibition of the serpiginous vesiculation mentioned in the first part of this paper. The color is due to the application of a mild silver nitrate solution.

Figure 621 shows the size of the flap. The cast represents it as flat and is incorrect in that it is, if anything, too evident. This of course may result in a flaccid ear and if this becomes too marked it is my plan to separate the wings of the envelope and insert some costal cartilages.



Fig. 622—Case VIII

D. Complete Transference of a Flap—Case VIII—Figure 622 shows an electric burn on the hand with destruction of all tissues resulting in a horny, crackling, fixed and painful area.

Figure 623 shows the flap raised from the right abdomen and the use of the gutta percha to prevent tubulization. The lower



Fig 623 —Case VIII



F g 624 —Case VIII

end was cut the area on the hand dissected out and the flap sewn in as shown in Fig 624. The flap is shown to be tubulizing and

depending upon its length arises the question as to whether this should not be done surgically at the time of the hand suture. Three weeks should pass before the upper end of the flap is cut away.

Figure 625 shows the transference and result of this plan. The principle of life to this flap is different than that of the dermal



Fig. 625—Case VIII

graft. Here the blood supply comes from the margin and the objection to this plan is that it takes a long time after transferring the flap for it to become adherent except at its margins. It is necessary to follow up these cases by a course of bandaging and pressure but the eventual result is very satisfactory.

I have also been trying out some delayed flap on the palate but do not feel prepared to make any comments upon

this procedure at this time and I believe that the delayed flap is surgically applicable to the hard palate only and that it is positively unsurgical to attempt any such plan on the soft palate. There have been some suggestions by New which have opened up great possibilities for postoperative defects. But in considering this subject I am gradually coming to the conclusion that the delayed flap may assume great value as a primary procedure in certain forms of cleft palate.

Conclusion —As I have indicated all of the above procedures are well known and the only possibility of advance will be the application of them to the individual case. The dermal graft is difficult of accomplishment and my present position is that I have a great deal to learn about it and that its use by surgeons may lead to startling results.

CLINIC OF DR. EMIL S. GEIST

ST. MARY'S HOSPITAL MINNEAPOLIS

FOOT DISABILITY AN ANALYSIS OF 781 CONSECUTIVE CASES

AN extremely prominent orthopedic surgeon commented deprecatingly on the capabilities of a confrere as follows: "He is an orthopedic surgeon from the ankle down."

No orthopedic surgeon cares to be called a "foot specialist." Nevertheless and notwithstanding it is a fact that a considerable percentage of the cases appearing in the office of the orthopedic surgeon are cases of foot disability, and a resume of the 781 foot cases seen in two consecutive years of private practice has brought forth a number of observations perhaps worth recording.

We are apt to consider the human foot as an organ finished in its developmental plan. Nothing could be further from the truth. While in the process of evolution the hand, for instance, has become specialized and developed in a wonderful manner, the foot has remained behind in the race.

Professor Herbert Walter of Brown University, in a book on the Human Skeleton, speaks of the "handy hand" and the "makeshift foot." In no portion of the human anatomy does one find a greater variation in the shape, size, and contour of the relative constituent parts of an organ than in the human foot.

As pointed out in a previous paper by the author (*Supernumerary Bones of the Foot—A Roentgen Study of the Feet of One Hundred Normal Individuals*, *American Journal of Orthopedic Surgery*, 1914) about one third of all normal feet present accessory bones; most of these are probably simply relics and

remnants of a prehistoric time. Some of these accessory bones occupy the same historic position in the human anatomy as the appendix tonsils and other organs which are destined in the last analysis for the anatomic scrap heap.

To quote Walter verbatim: Human feet have never quite recovered from their surprise at finding the body tipped up on end and in having thrust upon them the entire responsibility of its support. They have done the best they could in the evolutionary time they have had with the inherited materials that were on hand but it must nevertheless be confessed that the result is as yet only a makeshift foot. The various foot troubles of man are an eloquent confirmation of this statement.

In the first place man needed to have a considerable part of the foot bent at right angles to the leg so that it would come in contact with the ground and thus prevent the body from tipping over forward. At the same time a part of the foot namely the heel had to be detailed to project in the other direction to prevent tipping backward. Thus the human foot became plantigrade as a mechanical consequence of bipedality. The swift horse which perhaps has the most successful locomotor appendages of any quadruped has no more need of plantigrade feet than the leg of a table which maintains perfect equilibrium without flat foot.

We begin therefore with the premise that the human foot developmentally is still an unfinished organ. In addition to the fact that feet are makeshifts we the civilized portion of the human race put them into leather containers and walk upon unyielding surfaces when the original intention was that we should walk barefooted on grass or soft ground.

We have even in well fitting shoes and artificial floors at best unnatural conditions to deal with. Is it any wonder that we see cases of foot disability as an every day occurrence considering the ill shaped shoes and the hard floors which we find ever present?

Large factories are engaged in widely advertising and making thousands of so called arch supporters. It must be that these factories have a certain justification for their existence and that

their wares give a certain amount of comfort to the footsore. In no other way can one explain the continued existence and growth of these firms. Unfortunately the shoe clerk who fits these devices is not gifted with the art of differential diagnosis and it has been my experience in nearly every case of chronic foot trouble no matter what its origin or pathology that the patient arrives at the office wearing some form of commercial flat foot brace. In other words harm is often done and valuable time lost.

The study of the records of these 781 consecutive cases shows that only about one third of them are of the type classed as ordinary weak (or flat) foot. In the other two thirds there was real definite localizable pathology present.

The cases of this series can be grouped as follows:

Weak Foot—Two hundred and fifty nine cases (Of these 37 were of the rigid type.)

Other foot conditions accompanying or simulating weak foot 390 cases

Toe Disabilities—One hundred and thirty two cases

Weak Foot—Two hundred and fifty nine cases. The symptoms of ordinary weak foot are too well known for repetition here. Slow in onset, chronic, bilateral, more pain on standing than on walking, no pain at night, and multiple tender points about the feet are perhaps the outstanding features. The cause is always to be found in that the foot, the muscles of which are often artificially weakened by tight or badly fitting shoes, or following illness, is required to sustain a load too great for it. The proper treatment consists first in essentially strengthening the musculature of the foot which, as we all know, extends above the knee. This is one of the most important features in the treatment of simple weak foot. Second, the foot must be put into a well shaped shoe and stocking. Considering the variety and variation of human foot, there is no one type of shoe made which is conformable to all feet. One of the best average shoes which exist today is the Munson Army Shoe, which was adopted for army use some years ago and which was tried on a large scale during the mobilization of our great army, and which

was not found wanting. It seems the best average shoe made today. It is easily procured for men, not so easily for women.

During the painful period the shoe may be tilted so that the inner border is raised, an easy and satisfactory device being the tomahawk wedge.

The proper exercises combined with a properly modified shoe will adequately take care of about 80 per cent of all cases of simple weak foot. In the remaining 20 per cent some form of metal arch support becomes necessary. However the arch support should be prescribed with as much reluctance as one should use in giving a crutch to a cripple who possibly might do without it, or in giving morphin to a patient.

The 390 cases of other foot conditions accompanying or simulating weak foot are divided as follows:

Atte foot tr	14
Exost f t	8
Weak foot at tr scl s	25
Weak foot (distal ban f sory sc ph d)	12
Weak foot and a se	9
Weak foot—g no h al feet n	7
Foot msc ll e	28
Foot thrt	39
Foot fra t	10
Foot t be l	11
Foot h ll	4
Foot nf t u	15
Foot t t rsalg	64
Foot (w k w th h llux lg s)	11
Foot g r f tr ply	4
Cl pu	20
Cal fr t	11
Cl msc ll e u	18
Weak foot with sh t tend chl (muscl bo d foot)	80

Weak Foot with Arteriosclerosis—Twenty five cases of this series presented arterial changes in the feet. The *symptomatology is not that of ordinary weak feet*. The cases are usually bilateral. In our series there were 2 cases unilateral. It is observed slightly more in males than in females (males 18 females 7) average age was about fifty. Nearly all of them complained of pain at night. Cramps are a frequent symptom.

The wearing of metal arches usually causes increased discomfort. The feet get cold easily. Fairly frequent symptoms are swelling and numbness of the feet. On examination the feet are cold. In all cases the pulse of the dorsalis pedis artery or of the posterior tibial is either absent or very much diminished. α Ray frequently shows marked atheromatous changes. In 7 of the cases there was a history of excessive use of coffee and in 5 an excessive use of tobacco. This trouble occurs frequently in Hebrews. Nearly all cases gave a history of having tried various forms of arch support with either no relief or actual increase of symptoms. While not very much can be promised to these cases considerable relief is afforded by first the alternate hot and cold baths morning and evening second warm stockings especially at night. Third exposure to sunlight real or artificial.

Differential diagnostic features are the pain and cramps at night increase of pain from wearing arches and the absence of the pulse of the foot arteries (α Ray often helps in making a diagnosis).

Weak Foot with Varicose Veins—There were 9 cases of weak foot observed in which varicose veins were the chief etiologic factor. Four were in males and 5 in females average age of forty four years. The outstanding feature here is that in addition to the fact that proper shoes must be worn adequate attention must be paid to the varicose veins either by elastic stocking or by operation.

Chronic Arthritis of the Feet—Thirty nine cases. The age varied from twenty six to sixty average age being thirty seven. Males 15 females 24. This condition was found unilateral in 2 cases. In 14 cases there were the signs of chronic arthritis in other joints. There was an old history of acute articular rheumatism in 9 cases. In 12 of these cases we held the tonsils responsible and in 7 the teeth. In 2 of these cases the onset was two weeks after an attack of tonsillitis and in 3 cases the onset was two or three weeks following a gripe. In 4 of the cases there was distinct history of recent exposure to cold.

The symptoms of chronic arthritis of the feet simulate those of ordinary weak foot. Differential diagnosis is often extremely

difficult. Whenever possible the diagnosis of chronic arthritis should however be made as prognosis in chronic arthritis is not nearly so good as in simple weak foot.

On careful examination of such a patient a beginning arthritis can often be made out in other joints of the body (perhaps only in a finger or two) of which the patient himself may not be aware. The x ray offers considerable aid in most cases. On the picture there can be seen especially in older cases the characteristic lipping at the articular margins. Pain at night is a characteristic symptom and is often severe. The wearing of arch supports usually increases the pain and is a very suggestive sign. The treatment of chronic arthritis is disappointing. Plenty of warmth, warm stockings, large shoes with felt inserts often give relief. Sunlight long continued on the Rollier plan sometime gives relief.

Tuberculosis of the Tarsus—Eleven cases. Average age of twenty five years, age ranging from sixteen to fifty. Males 5 females 6. In 5 cases a definite history of injury. Nearly all of these cases were mistaken for flat foot especially at the beginning of the symptoms. In 2 of the 6 cases this mistake was made by the writer. We should be extremely chary in calling a unilateral foot condition weak foot. Weak foot is almost always bilateral while tuberculosis of course is practically always unilateral. Several of these cases of tuberculosis of the tarsus appeared with flat foot arches which seemed to increase the pain. x Ray usually settled the diagnosis combined with the history and physical findings (swelling, local heat, general temperature).

The treatment is that of surgical tuberculosis elsewhere. In 2 cases it was possible to remove totally the disease area by means of a transverse resection of the tarsus. Several other cases did well by means of right angle fixation splint combined with the Rollier sunlight treatment. Several of the cases dropped from observation. One case submitted to amputation.

Illustrative Case—C. S. male age eighteen. Swede farmer. Previous health tonsillectomy two months ago otherwise negative. History of present illness. Seven months ago when

patient was hauling and unloading sand noticed some pain in right foot foot began to swell on the top after a week or so foot kept getting a little worse gradually until about four months later when he stopped working and went to a physician who applied a plaster cast Since then patient has been living around the house doing no work Cast remained on for two weeks then another one applied Casts have been applied ever since Conditions has been getting worse During the past week patient has hardly been able to sleep

Present complaint Pain in the arch and through the body of the foot Hurts nearly all the time Patient has been using crutches for the past five months No trouble with other foot

Physical findings Right foot markedly swollen over the mediotarsal region Considerable atrophy of the musculature of the leg Swelling is general However it is most marked on the dorsum Slight swelling of the toes marked local heat of the dorsum of the foot also tenderness Some tenderness on deep pressure over the plantar portion of foot No reddening On measurement about $1\frac{1}{4}$ inches of swelling Wassermann negative Tuberculin subcutaneous positive τ Ray shows tuberculosis involvement of Lisfranc's joint Operation transverse incision U shaped flap excision of Lisfranc's joint Plaster cast Primary healing One year later patient is walking on foot Foot is somewhat shortened otherwise normal Motions of toes O K

Weak Foot Gonorrheal—Seven cases Average age twenty five All male Time of onset of foot symptoms after gonorrheal discharge two weeks to four months The exact relationship of gonorrhea to so called gonorrheal flat foot is not yet definitely established However the occurrence of this trouble after the original infection is regular enough to warrant the belief that there exists an etiologic relationship More over this form of foot complaint is extremely unyielding to any form of therapy The outstanding feature of therapy is to recognize not only the necessity of treating the foot condition but also to take care of the primary infectious focus located in the genito urinary apparatus

Foot Infection—Fifteen cases These cases are to be divided as follows

	C
O t my l t calc	1
Pero tit m t t sal gi	3
I f t o s b t te do hll	1
Ge al ed st my l t foot ch	2
M tata al o t my l t	7
O teomy l t scapho d	1

Chronic osteomyelitis which is due to a germ of low virulency may sometimes superficially simulate weak foot. It is of course easy to differentiate. The trouble is unilateral. x Ray and blood count usually clinch the diagnosis together with the history of the case. Treatment of osteomyelitis is the same as that elsewhere. Owing to the fact that it is difficult to obliterate old bony cavities in osteomyelitis of the tarsal bones the writer has in 2 cases used a free fat transplant in filling up these cavities.

Miscellaneous Pathologic Conditions—Twenty eight cases These cases were divided as follows

	C se
Fo g bod s pect d	
Needl	4
P bbl	1
P c f l th r	1
Gl	1
Pe o t t	3
Bu t (bo t mall l)	1
L p m	2
A hll dyn	4
Go t	1
Te yn t	2
Hy te	3
Ray d s d e	1
L (te d)	2

Foot Weak (Disturbance of the Accessory Scaphoid)—Twelve cases As far as the writer knows this condition has not been previously described. Ages range from twelve to forty three average age being eighteen. Occurred eight times in females and four times in males. Symptoms were unilateral in 8 cases and bilateral in 4 cases. The unilateral right foot

5 left foot 3 x Ray showed unilateral accessory scaphoids in 5 and bilaterals in 7 cases

The accessory scaphoid is a structure which has been observed for many years. It occurs normally in from 12 to 16 per cent of all feet. It may be large or small unilateral or bilateral. At times this normal structure gives rise to pain. A few of the patients gave a history of slight injury the majority however gave a history of no injury. The pain and tenderness are confined to the region of the scaphoid and x ray reveals the presence of an accessory scaphoid. In 5 of the cases the trouble was severe enough to warrant removal of the accessory scaphoid which resulted in complete cure. Two of the cases got well without operation 1 case is still complaining the remaining 4 cases were lost sight of. This condition has mistakenly been termed a fracture of the scaphoid due to mild injury.¹

Foot Fracture—Ten cases. Fractures of the tarsal and metatarsal bones often go unrecognized at the time of the injury. Nearly all of the above 10 cases were seen a long time after the occurrence of the fracture and came complaining of indefinite painful foot symptoms. Occasionally the history of trauma is difficult to elicit either because it was so slight or because so much time had intervened. While most of the cases were seen at periods of four to six months after the fracture 1 case was seen thirty nine years after the occurrence of the fracture and another case fifty years after.

Fractures of the metatarsals are especially prone to cause more or less painful symptoms. Especially is this true with the fractures of the base of the fifth metatarsal which is often unrecognized at the time of occurrence and if not taken care of properly will produce a painful foot condition lasting for months.

Foot Exostosis—Eight cases. Owing probably to the wearing of too short shoes a frequent exostosis is to be found at the base of the first metatarsal. In our series there were 5 cases of distinct thickening in this location. In 1 case there

This disease process may be the same one as is often present in the juvenile hip (Legg's disease) or in the adolescent knee (Schlatter Osgood knee).

was an exostosis below the internal malleolus and in 7 cases an exostosis below the external malleolus mechanically interfering with proper function of the ankle joint

Acute Foot Strain Fourteen cases Acute foot strain is sometimes differentiated with difficulty from the ordinary type of weak foot with the exception that here again as a rule we have a unilateral instead of a bilateral condition to deal with There is a definite history of moderately severe trauma The ordinary type of Gibney strapping is usually all that is necessary in these cases

Weak Foot with Hallux Valgus—In 11 cases there was distinct association of marked hallux valgus with ordinary flat foot symptoms It goes without saying that the condition of weak foot cannot be treated until the hallux valgus is properly taken care of In this connection it is also well to say that calluses and corns are frequent conditions accompanying weak foot and must be properly dealt with if we are to achieve success in the treatment of ordinary weak foot

Spurs of the Os Calcis—Twenty cases It must be remembered that spurs of the calcis are structures sometimes found in supposedly normal feet In a series of one hundred painful feet they were found in 2 cases However these spurs are usually the result of chronic infection sometimes due to gonococci and sometimes following some other form of infection such as la grippe In a patient afflicted with heel pains we are sometimes able by means of x ray pictures extending over a period of months to show the development of a calcaneal spur Normally there exists in the same region a large bursa which may be the chief source of trouble In the treatment of these spurs it is well to remember that their removal usually means a cure however not always In removing them one should always be careful to remove the bursa or bursa which are adjacent It is sometimes a question whether the removal of the bursa *alone* would not be enough to effect a cure in most cases

Fracture Os Calcis—Eleven cases Fracture of the calcis

feet in a standing position. The writer has seen 1 case in which the opposite was the case. A sewer over which the patient was standing exploded thus shattering the calcis. The orthopedic surgeon sees most of these cases after a lapse of months. The average time these 11 cases were seen was at about six months, the longest one being fourteen months after the injury.

a. Rays of all these cases show, as a rule, marked displacement of the fragments and consequent deformity and thickening of the os calcis. In one such case of fresh fracture of the calcis a U shaped incision was made about the heel, the entire calcis was laid bare, and the shattered fragments were brought into accurate apposition and held there by means of multiple loops and ties of chromic catgut with a perfect result. In several of these cases the patient came to the consulting room with a diagnosis of traumatic flat foot, an almost unpardonable mistaken diagnosis since the use of the x ray is available.

Calcis, Miscellaneous—Eighteen cases. Under this heading the following cases may be classed:

Achillodynia	1 case
Exostosis (calcis)	1 (in rear of calcis)
Bursitis	3 cases
Apophysitis	1 case
Periostitis	3 cases
Tuberculosis calcis	1 case
Cyst calcis	1
Osteomyelitis	2 cases

Weak Foot With Short Tendo Achillis—Eighty cases. About ten years ago the writer called attention to the frequent occurrence of a short tendo Achillis with weak foot, and pointed out that a short tendo Achillis stood in etiologic relationship to the weak foot. Long before this time Schaffer of New York had also pointed to the same etiological factor of a great many cases of weak foot. Since this time a number of contributions on the subject by Hibbs and others on the Muscle Bound Foot called further attention to this subject. In routine examination in the army it has been estimated that at least 10 to 20 per cent of the flat feet were due to this condition of

shortened tendo achillis. The degree of shortening can be moderate or severe. It is often although not always due to the high heeled shoe so often worn by women. In a number of cases a short heel cord was found in children from five to fifteen years of age. In severe and aggravated cases the remedy consists in an achillototomy. This however is not to be done until every other means for the relief of pain has been exhausted as section of the tendo achillis is a severe operation often seriously incapacitating the foot. In those cases however which are carefully selected great improvement results not only as far as the relief of pain is concerned but also in the function and appearance of the foot. In a larger group of cases the tendon can be stretched by means of correctly applied plaster-of-Paris bandaging. It is often surprising how the arch will reconstitute itself after stretching or section of the tendo achillis. We all know that in paralysis of the posterior leg musculature there often occurs a marked increase of the normal arch of the foot (hollow foot). A similar process takes place when a short tendo achillis is lengthened.

Toe Cases—One hundred and thirty two cases. The cases of toe pathology in this series were subdivided as follows:

Fra ture	9
Go t	8
Hamm toes	15
Hallux rigidus	10
Hallux algi	61
Osteomyelitis	4
Tuber cles	3
Miscellaneous	22

Conclusion—In conclusion it may be said that cases of foot disability are to be carefully studied and *not* called flat foot indiscriminately. It will be found that *many* of the cases can be *excluded* as not belonging to the ordinary type of static foot disability but fall into one or the other of the groups listed above. Since intelligent *treatment* is based upon correct diagnosis the importance of making the differentiation is obvious.

LOOSE BODY KNEE FOUND BENEATH EXTERNAL SEMILUNAR CARTILAGE

THE following case is of interest because of the unusual place in which the loose body was found. Repeated x rays (see accompanying tracings Figs 626 627) showed the loose body apparently anchored in the same place in the region of the external meniscus.

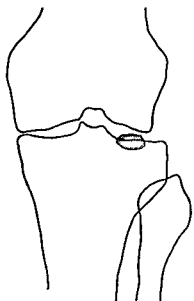


Fig 626

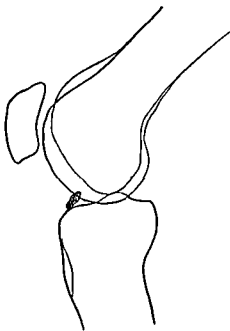


Fig 627

On opening the joint through a curved (Jones) incision the loose body sought for was not seen as readily as was anticipated. In fact it was only after considerable instrumental search that it was finally located beneath and completely hidden by the external meniscus. The loose body had inserted itself between the lower surface of the external semilunar cartilage and the upper surface of the tibia. It was not adherent and was easily 'popped out' of place after it was located.

Case Report—No 5951 Injury thirteen years ago
sprained knee Plaster cast for two months Knee has
always been a trifle weak No particular trouble for about
eleven years until patient sprained the knee again Following
this second injury repeated attacks of locking occasionally
several of the e attacks in one day Knee swelled after nearly
every attack

On examination (December 3 1921) there existed marked
swelling and effusion of the knee joint A plaster of Paris ca t
was accordingly applied to allow the effects of trauma to subside
By December 28th the knee looked normal December 30 1921
operation Curved incision 6 to 8 c c of bloody fluid evacuated
After considerable search the loose body was found located
beneath the external semilunar cartilage On examination of
the lower end of the femur it was possible to note that the loose
body had been extruded from the mesial edge of the internal
condyle (osteochondritis dissecans) Sub equent course of
events favorable Reactionless wound healing and complete
relief from symptoms of locking

ALBEE BONE GRAFT OPERATION IN TUBERCULOSIS OF THE SPINE A FEW UNEXPECTED RESULTS

THE following 5 cases (of 75 Albee bone graft operations in tuberculosis of the spine) present elements of interest In 2 cases a second tuberculous infection occurred in the spine at a distance from the site of the first infection One of these patients submitted to a second bone grafting operation in order to rigidify another portion of the spine

Fracture of the graft occurred in 1 case

In 2 cases there occurred paralysis while the patient was lying in bed recovering from the effects of the bone grafting operation

Case I—No 6059 Female aged thirty two Typical tuberculous spine Destruction of body of seventh dorsal Albee bone graft operation September 25 1918 followed by helio therapy Perfect result until January 1922 when patient reports small lyphos beginning in the upper lumbar region x Rays show marked involvement and destruction of second lumbar vertebra Operation February 2 1922 Typical Albee operation immobilizing lower dorsal and practically the entire lumbar spine April 1 1923 patient was doing well and not complaining of symptoms attending to her work

Case II—No 3354 Male aged twenty Typical tuberculous spine involvement of bodies of first and second lumbar Albee bone graft operation March 13 1919 Patient considered himself cured until March 2 1923 x Ray now shows tuberculous definite involvement of ninth and tenth dorsals surrounded by typical fusiform tuberculous abscess

Case III—Fracture of Graft—Female aged twenty five Typical tuberculous spine Tenth and eleventh dorsals affected

Slight amount of angulation Albee bone graft operation Reactionless healing Remained well for about two years when sudden onset of pain following mild injury x Rays revealed fractured graft and increase of the amount of bony destruction of the bodies in the infected vertebra Went elsewhere for second Albee operation and according to report is doing well

Case IV —Paralysis —No 4748 Male aged thirty eight Tuberculous spine Seventh and eighth dorsal vertebrae Small definite kyphos Knee reflexes slightly increased Typical Albee operation January 5 1920 Patient did nicely for about one year after which time gradual onset of paralysis Leg reflexes markedly increased Put to bed immediately where he remained for about one year Paralysis gradually disappeared and patient is now walking about apparently cured of his tuberculous spine Gait is slightly spastic Reflexes still markedly increased

Case V —Male aged forty Tuberculous spine Involvement of eleventh and twelfth dorsals Fairly well marked kyphos Reflexes normal Albee operation February 14 1921 typical Albee operation Reactionless healing Patient quite restless in bed Eight weeks following the operation beginning numbness in legs Reflexes became exaggerated In spite of absolute rest in bed paralysis progressed so as to become total and gradually involved bladder and bowels Patient's general condition became poor and he died five months following the operation

GENU RECURVATUM FOLLOWING RESECTION FOR TUBERCULOSIS

THE following illustrates what can happen to a knee joint which has been resected when no proper protection has been given. It is of course well known that following resection of the knee the knee should be protected by means of a plaster splint or other form of brace for at least a year in order to prevent flexion contracture.

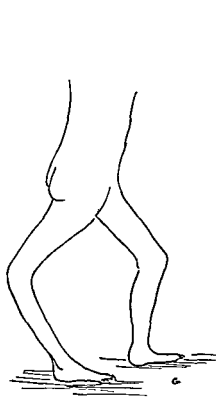


Fig 628

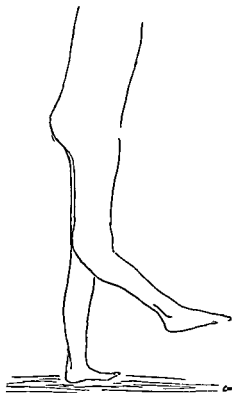
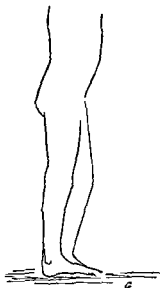


Fig 629

In this particular case deformity resulted in the opposite direction (genu recurvatum) (Figs 628-630). Bony ankylosis existed and by means of a wedge osteotomy the deformity could be easily corrected.

Case Report—No 3363 First operation A resection of right knee for tuberculosis (this resection done elsewhere seven years ago) The deformity commenced about one year following the resection At the time of our first examination the deformity existed as shown in Figs 628 629



F g 630

Second operation (April 1 1914) Wedge resection plaster cast followed by brace which was worn for about two years Result shown in Fig 630

BIESALSKI'S OPERATION PANASTRAGALOID ARTHRODESIS IN TUBERCULOSIS OF THE ANKLE

UPON recommendation three years ago by Dr Fred Gaenslen of Milwaukee the writer has performed this operation six times on advanced cases of tuberculosis of the ankle joint in the adult cases which in my opinion might otherwise have been considered amputation cases. Four cases are too recent to report at this time. Two cases here reported were both operated in December 1921 and the patients are now walking on their feet without pain and are apparently cured. The accompanying sketch (Fig 631) shows that the arthrodesis involves the ankle joint

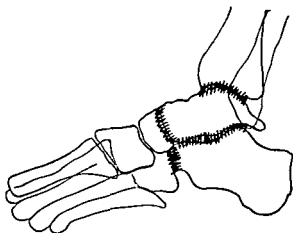


Fig 631

the subastragaloid joint the astragalonaviclar joint and the calcaneocuboid joint. Complete fusion in all these joints must be aimed for.

Case I—No 5990 Female aged twenty five Sprained left ankle March 1919 Laid up a week at the time Swelling and pain on outer portion of ankle Bandaging relieved condition Feet all right after that except she frequently turns the ankle About March 1921 gradual onset of swelling Three casts applied Has used crutches from time to time Present complaint Pain and swelling in ankle Patient limps

Examination—Left ankle Marked swelling Contours of ankle joint effaced Chief swelling in region of external malleolus

lus Fluctuation Considerable tenderness over the ankle joint especially anteriorly Foot held markedly extended All motions painful Foot can only be brought to about 110 degrees dorsiflexion Considerable local heat Great atrophy of the leg musculature X Ray shows typical tuberculous involvement of both tibia and astragalus Diagnosis tuberculous ankle Wassermann negative

Operation (December 24 1921) Whitman incision Eight or 10 c c of tuberculous pus which contained tubercle bacilli encountered Articular cartilages of lower end of tibia as well as upper end of astragalus were loose and partially detached Considerable erosion of articular cartilage Involvement of the astragalocalcane joint Complete denuding by means of chisel and gouge of the tibio astragaloid the astragalonavicular the astragalocalcaneal and the calcaneocuboid joints Plaster cast Twenty four hour drain Repeated casts following this until September 1922 when brace was applied Heliotherapy ever since operation Sinus closed Wound completely closed in July 1922 December 1922 brace discontinued April 1922 patient walking on foot Absolute ankylosis at ankle joint Foot painless

Case II—No 5932 Male aged nineteen Left ankle Gradual onset beginning about June 1919 Sprained ankle frequently In June 1921 gradual onset of swelling Pain about ankle joint Patient began to limp Wore metal splint until day of examination

Present complaint Swelling of ankle Pain on use Patient walks with crutches On examination (November 29 1921) foot in marked equinus Left ankle swollen so that entire joint contours were effaced Considerable local heat Fluctuation Atrophy of the leg musculature

Operation (December 12 1921) Typical Biesalski pan astragaloid arthrodesis Plaster casts applied and reapplied until about August 1921 This followed by brace Patient is now walking with brace ankle and foot being practically normal absolute ankylosis at ankle joint having supervened

CLINIC OF DR JOSEPH D LEWIS

MINNEAPOLIS GENERAL HOSPITAL

EXTERNAL NASAL DEFORMITIES OF TRAUMATIC ORIGIN REPORT OF SIX CASES

UNTIL comparatively recent years the treatment of external injuries of the nose was included in the scope of the general surgeon's field of endeavor. But now largely because of a better and broader training and a more comprehensive knowledge of the external and internal structures of the nose this highly specialized work is generally delegated to the rhinologist. In addition to being more familiar with the anatomic and physiologic phases of the subject and because of greater experience and improvements in methods the modern rhinologist is able to achieve by intranasal subcutaneous procedures and thus avoid a scar that which the general surgeon perforce accomplishes by an external approach. Furthermore the majority of external nasal wounds are accompanied by intranasal injuries which, if not properly managed frequently result in functional impairment. Therefore in addition to obtaining a satisfactory cosmetic result successful treatment of nasal injuries must include measures which will re establish the intranasal function.

Injuries to the nose are common ranging in degree from contusions dislocations and compound comminuted fractures to injuries so formidable that the nose is partially or completely destroyed. But this article is limited to a consideration of the more common injuries which embrace fractures and dislocations of the nasal bones the nasal process of the superior maxilla perpendicular plate of the ethmoid bone and the triangular cartilage of the septum. The vomer even in extensive fracture dislocations usually escapes injury.

The following 6 cases detailed in the succeeding context have been selected for the reason that they seem quite representative of the common types of nasal deformities caused by traumatism

REPORT OF CASES

Preparation—The nares are cleansed by spraying with warm Dobell's solution. The skin of the nose, forehead, a part of the cheeks, and upper lip are sterilized with McDonald's solution and the head and face covered with a moist sterile towel through which an opening is made to expose the nose.



Fig. 632

Fig. 633

Fig. 632—Case I. Preoperative appearance.

Fig. 633—Case I. Postoperative result.

Anesthesia—The nasal mucosa is sprayed with a 1 per cent solution of cocaine containing 20 drops of epinephrin to the ounce and followed by two or three applications of a 20 per cent solution of cocaine. The cutaneous tissues are anesthetized by circumferential infiltration of a 1 per cent novocain solution to which 10 drops of epinephrin have been added.

Case I (Figs. 632, 633)—This lad, aged fifteen, was injured during infancy and as a result of a fracture dislocation

of the cartilaginous portion of the nasal septum the nose is markedly deflected to the right. The greatly deviated and thickened nasal septum has left very little space in either nasal chamber and as a consequence plainly indicated in the accompanying photograph he is a confirmed mouth breather.

Operation—Immediately following a submucous resection of the nasal septum with knife and forceps introduced between the mucoperichondrial flaps the remaining superior portion of the triangular cartilage was separated from its attachment to the perpendicular plate of the ethmoid bone. The nose was then forced as far toward the left side as possible and there retained with a gauze collodion dressing for a period of ten days. Functionally and cosmetically the result is satisfactory.

Case II (Figs 634-637)—About ten years ago this man aged sixty-four received an injury which crushed the left nasal bone and dislocated the right. Intranasal examination disclosed a deflected septum due to a fracture of the perpendicular plate of the ethmoid and the triangular cartilage of the septum. His nose like that described in the preceding report was deflected from the median line.

Operation—The soft tissues over the nasal bone infra glabellar notch and the nasal processes of the superior maxillæ were elevated by the intranasal subcutaneous method and the nasal bones disarticulated and reset to conform as nearly as possible to their original position. On the side of the depressed fracture a Simpson Bernay tampon was introduced between the septum and the nasal bone (then moistened to cause it to expand) to retain the bone in its proper position. The right nasal bone now freed of its attachments was returned to its normal position as nearly as the scar tissue would permit and a dry Simpson Bernay sponge corresponding in shape to the nasal bone was placed over it and held in place with several strips of adhesive plaster applied in laminated fashion from cheek to cheek—a method originally suggested by Dr Harmon Smith—and the sponge moistened to increase the pressure by its expansion.

Subsequently a submucous resection of the septum will be necessary to restore intranasal configuration and also to correct

Fig 634

Fig 635

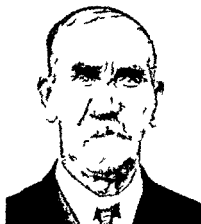


Fig 636

Fig 637

Figs 634-635 Case II Postoperative appearance
Figs 636-637 Case II Postoperative result

the lateral displacement of the lower portion of the nose as in the preceding case

Case III (Figs 638-641) — This man aged seventy two was injured about fifteen years ago when he was thrown from a vehicle and as a result of direct violence the right nasal bone

Fig 638



Fig 639



Fig 640



Fig 641

Figs 638-639 — Case III Preoperative appearance

Figs 640-641 — Case III Postoperative result

was crushed and depressed the left also being fractured and dislocated

Operation — The nasal bones were returned to their original

positions and there retained by procedures similar to those described in the preceding case which yielded a very satisfactory result

Fig 64



Fig 643



Fig 644

Fig 645

Fig 64 643—Case IV Preoperative appearance

Fig 644—Case IV Four days after operation

Fig 645—Case IV Final

Case IV (Figs 642-645)—Twelve hours ago this patient aged twenty five received a heavy blow with the fist in the

region of the left nasal bone and as shown by the accompanying photograph there is a compound comminuted fracture and depression of the left nasal bone. The right nasal bone has been dislocated outward and downward so that about one third of it rests on the nasal process of the superior maxilla. The perpendicular plate of the ethmoid also was fractured and the posterior portion of the nasal septum is deflected toward the left. The depression between the nasal bones and tip of the nose existed prior to the injury.

Operation—With a strong elevator introduced intranasally the left nasal bone was forced upward into its original position and a Simpson Bernay tampon anointed with 10 per cent bismuth paste inserted between the septum and nasal bone to maintain it in its normal position. The fractured and dislocated columella was straightened by applying pressure with Roe's forceps and held in place with a Simpson Bernay sponge introduced into the left nasal chamber. The pressure of the sponges is increased by causing them to expand with moisture. The sponge splints are changed daily and discontinued on the fourth day. By manual manipulation and pressure the dislocated right nasal bone was easily reduced and a dry Simpson Bernay sponge shaped to correspond to the size of the bone was placed over it and held in position with several strips of adhesive tape. If desired the pressure exerted by the dry sponge may be increased by moistening it. Cosmetically and functionally the result is excellent.

Case V (Figs 646-649)—This patient a medical student aged twenty four received a compound comminuted fracture while playing basket ball May 1916. A general surgeon partially reduced the dislocation and sutured the wound. Two weeks later during a baseball game he suffered another injury in the same region and a spicule of bone was removed by an external incision. Since that time there has been a slow overgrowth of osteoid tissue producing a dorsal hump as shown in the accompanying photographs.

Operation—In addition to the preparation previously

out with warm sterile water the columnar incision was closed with two sutures. A dry Simpson Bernay sponge was placed over the dorsum of the nose and held in position with several adhesive strips then moistened to increase the pressure and thus prevent the formation of a hematoma. The dressing was removed in twenty hours and the sutures two days later.

Comment—The subcutaneous method of gaining access to the nasal dorsum described above being based on sound anatomic surgical and cosmetic principles has the following advantages over the procedures hitherto proposed for the same purpose. The field is amenable to sterilization rendering infection an almost negligible factor the parts being readily accessible to manipulation the technic is simplified and traumatic minimized annoying hemorrhage is avoided the small incision promptly heal without leaving a visible token of the surgical intervention.

Case VI (Figs 652-655)—Several years ago this man aged thirty-two was injured in an automobile accident. In addition to the depressed fractures of the nasal bones the tissues over the dorsum of the nose were cut in several places with broken windshield glass. The intranasal structures were uninjured.

Operation—The procedure employed in this case differs from that described in the preceding one in that the tunnel effected from the tip of the nose to the infraglabellar notch was made exactly in the midline of the nasal dorsum and not more than 1/4 inch wide. A suitably shaped celluloid implant (Fig 651 c) was then introduced into the pocket to correct the depressed nasal deformity and the initial incision closed as in the preceding case.

Regardless of the prosthetic material employed for the correction of depressed nasal deformities the columnar hood incision has several distinct advantages namely forward or lateral displacement; prevented the sutures are well removed from contact with the supporting material and the slight scar owing to its location is almost invisible.

Comment—There is a general strong deep rooted prejudice

against the use of foreign substances as a supporting material for the relief of depressed nasal deformities based on the knowledge gained from clinical experience that they act as tissue

Fig 652

Fig 653



Fig 654

Fig 655

Figs 652 653—Case VI Preoperative appearance

Figs 654 655—Case VI Postoperative result

irritants and sooner or later become extruded. In a wide sense this contention is well authenticated. But celluloid is the outstanding exception for it has been conclusively proved by

those who have used this material that it will remain indefinitely within the nasal tissues without causing any irritation and therefore does not become extruded

Only those who have had no actual experience with the use of celluloid condemn the method and therefore the assumption that the idea is fundamentally unsound rests wholly on the foreign body theory

My own experience based on a series of 25 cases in which celluloid implants have been employed for the correction of depressed nasal deformities without a single extrusion is striking proof that celluloid cannot with justice be included in the category of the tissue irritating foreign bodies. The implants have remained as introduced into the tissues over periods ranging from a few months to more than five years.

The manifold advantages of celluloid over paraffin bone and cartilage having been fully set forth in a previous article,¹ it suffices here to say that being perfectly convinced of the notable merits of the method I venture the prediction that eventually it will be viewed as the ideal supporting material and supersede the method now in vogue.

Depressed Nasal Deformity: A Comparison of the Prothetive Value of Paraffin Bone, Cartilage and Celluloid in the Repair of Cases Collected with Celluloid Implant by the Author. Method Analysis of Otolaryngology and Laryngology. J. 1923. 1:32 N. 2

CLINIC OF DR ARCH A E WILCOX

MINNEAPOLIS GENERAL HOSPITAL

EQUIPMENT FOR THE STANDARDIZATION OF THE TREATMENT OF FRACTURES

THE apparent increase in the number of traumatic cases admitted to the surgical service of the Minneapolis General Hospital is undoubtedly a fair criterion of the experience of institutions of a similar character in other rapidly growing municipalities. The preponderance of these cases is fractures of the long bones of the extremities.

As the work of this type has progressively increased on my service we have found it necessary to attempt at least to standardize in a way the treatment and the equipment utilized in the management of these cases.

Anyone who has had the responsibility of a large fracture service will appreciate the accompanying inconveniences and handicaps which usually exist where no definite system of treatment is in vogue and where splints and apparatus are stored at some distance away in dark rooms in disorder and confusion. Therefore for the purpose of simplifying the management of these cases to save time and attempt to bring about better results I have devised the following equipment and system which is now in operation on my service at the Minneapolis General Hospital. While it is by no means perfect it has proved a distinctly progressive step and convenience in the treatment of fracture cases.

The equipment consists of a fracture tool truck, a set of three splints, fracture beds and Balkan frames, and a room is provided directly off the fracture ward where truck, splints and auxiliary apparatus are stored when not in use.

The truck which is shown in Fig 656 is made of angle iron and mounted upon heavy rubber tired wheels which makes it practical to wheel anywhere in the ward and carries a set of splints weights rope pulleys set of tool such as hammer wrenches coaptation appliances felt leather rubber adhesive plaster mole skin towels pins etc A vise is mounted on one end and this is useful in bending rods and rings to proper angles

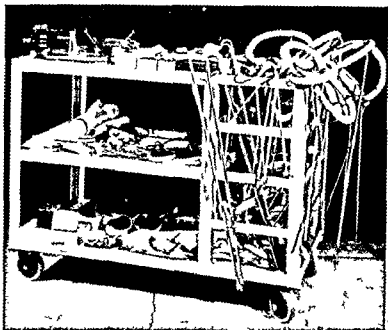


Fig 656

The splints referred to consist of three types which constitute a set and are designated as A B and C (See Fig 657-659) As this is the original presentation of this equipment certain detailed description is deemed permissible

The A splint is a modified Thomas Williams splint being adjustable as to length and is also supplied with four different sized rings which can be used for the right or left limbs It will be noted that the ring A¹ is directly connected with two horizontal rods which are inserted into the long U bar A² which

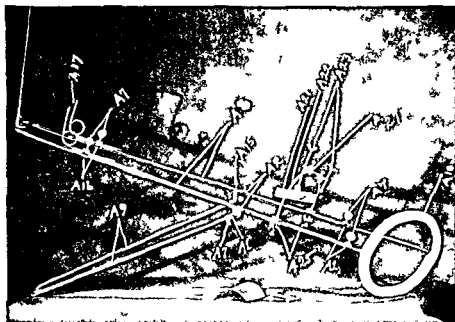


Fig 657—Model A leg splint A1 Plain set collars A2 set collar with hinge A7 eye set screws A8 U slide tube A9 U slide tube A10 rings A15 side swinging rods A22 arch rod and nuts A23 adjustable screw ball and wing nut A25 bar clamp and screws A27 adjustable screw clamp and screw A17 foot spring

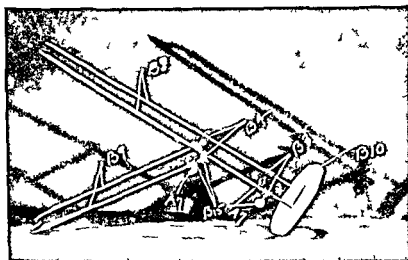


Fig 658—Model B leg and arm splint A7 Eye set screws B3 plain set collar B4 set collar with hinge B8 U slide tube (log) B9 U slide tube (shot) B10 rings and rods B15 side swinging rods

makes it possible to increase or decrease the length of the splint at will and fixation of the e rods is accomplished by set screws A^7 . The hinged collars which travel on the horizontal bars A have rods attached which are inserted into the U bar A^9 making it possible to adjust this flexion bar at any position on the main splint thus providing a readily adjustable apparatus for early motion of the knee in fractures of the femur. The foot piece A^{17} is adjustable for any length of limb by the collars

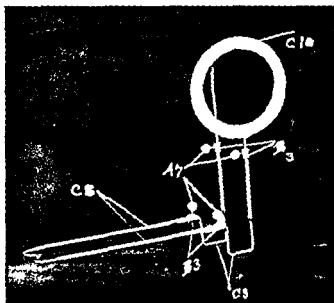


Fig 659 —Mod I C arm splint A^7 Eye set screws $B3$ plain set collars $C8$ U slide tube (forearm) $C10$ ring and rods $C9$ sliding rod and tube (arm) $A21$ aluminum plate $A16$ foot spring foot collar

A^8 and set screws A^7 adjustment of these parts preventing toe drop still allowing exercise of the ankle joint. The arched rod A^2 is fixed to the parallel bars by set screws and clamp A^5 and can be moved longitudinally on the horizontal bars and provides a fixed point for the adjusting screw ball and wing nut A^3 and the aluminum plate A^1 where direct pressure is needed. This arched rod makes it possible by adjusting the fixture A^7 to bring direct pressure in any diameter of the limb. The rings

of these splints are padded with felt covered with chamois and the aluminum plate A containing only a small amount of

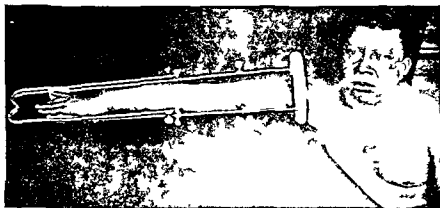


Fig 660

copper makes it possible to take x rays with the portable machine without interfering shadows

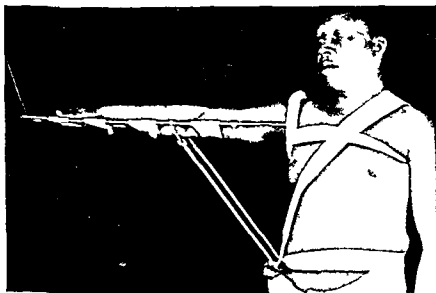
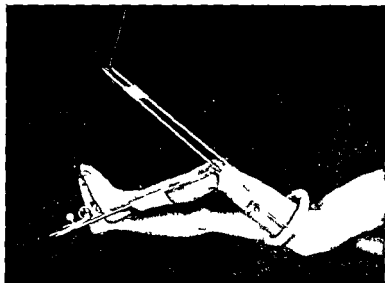
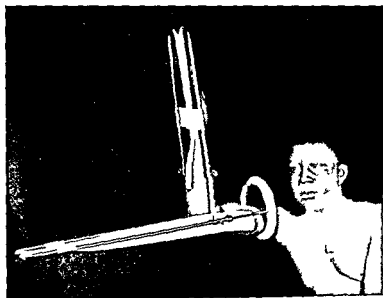


Fig 661

The B splint is a small A splint and from the description of the latter the mechanical arrangement of B is obvious except



F g 662



F g 663

it will be noted in Fig 660 the rings are at right angles to the rods which are inserted into the U bar B³. The rings being at right angles this splint may be used for

- 1 Abduction treatment of fractures of the upper arm (Fig 660)
- 2 As an aeroplane splint (Fig 661)

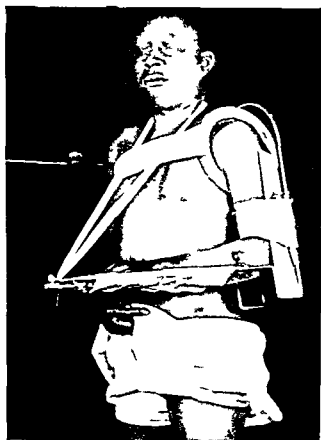


Fig 664

- 3 For fractures of the thigh or leg in children over six years of age (Fig 662)

- 4 Fractures of the upper arm accompanied by injuries to the lower arm in which extension in two different directions is necessary (Suggested in Fig 663)

This is an extremely useful splint and many other combinations will suggest themselves to the operator. When using this

splint upon the young adult as a leg splint it is necessary after choosing the ring which fits the leg to bend the bars connected with the ring to such an angle as may be appropriate to suit the groin of the patient

It will be noted that the A splint rings are all made at an angle of 45 degrees to the horizontal bars but it is frequently found necessary to change this angle and these rods are easily bent

The C splint is a modified Jones splint (Fig 664) It has four different sized rings the same as the A and B splints

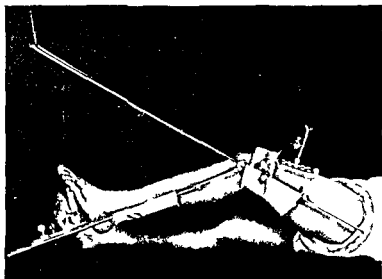


Fig 665

and is adjustable as far as length is concerned by adjusting the bars C⁹ and C⁸ fixation of same is accomplished by fastening with set screws A⁷ This allows for lengthening the bars for the forearm or arm and by turning rings about the splint can be used on either the right or left arm

A suggestion of the use of this splint is shown in Fig 664 and for splint A in Figs 665 666 None of these dressings are complete They are only presented as suggestions as to the fundamental application of the splints

Extension by calipers adhesive plaster or pins and the treatment by open or closed methods are not in any way interfered with by the use of this apparatus and it has become our custom in operative cases to use these splints routinely rather than plaster casts. It has also been our custom when fracture cases are brought to the hospital after first aid has been rendered and some definite idea as regards the course of treatment has been decided upon to wheel our fracture truck into the

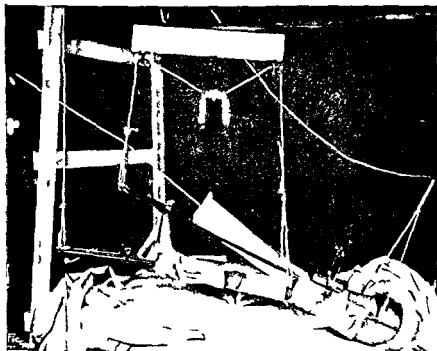


Fig 666

ward select the ring which fits the patient and the parts to which it is to be applied and then directly from the tool cart or truck to complete the dressing at one sitting subsequently checking with a ray and adjusting accordingly.

Since we have had sufficient apparatus of this type and housed as suggested in the beginning of this article the house officers and interns have taken much more interest in fracture work. The results I am sure have been infinitely better much

time has been saved and the co-operation of the patients in doing their part has become quite prominent. For instance in early motion of the knee joint in fractures of the thigh pulleys and ropes are arranged to the flexion bars and the patient has helped to a great degree in early re establishment of function in this joint which formerly has given so much trouble when allowed to remain too long in fixed apparatus.

FRACTURE OF RIGHT AND LEFT TIBIA AND FIBULA— LOWER THIRDS

THE following case is reported on account of the difficulties in treatment

Thus young lady Miss J eighteen years of age was injured September 25 1920 Her injuries consisted of a compound

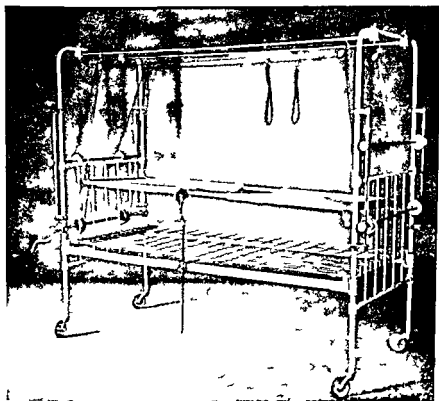


Fig 667

fracture of the right tibia and fibula lower third simple fracture of the left tibia and fibula lower third She was alighting from a street car and had reached the pavement when a motor cycle traveling at a high rate of speed struck her inflicting the above injuries

After repeated attempts at reduction of the fractures it seemed wise to consider them operative. The young lady's family however refused to have her operated and consequently we were compelled to use extension and fixation as a treatment of choice. Extension was accomplished by applying fairly heavy plaster casts the malleoli insteps and heels being well padded with heavy saddler's felt. Extension was made directly through the casts both limbs being slightly abducted. Patient was on a Bradford frame swung on the author's fracture bed.



F g 668



F g 669

F g 668 669—Illustration of M. J. Fract. of both bones of both legs

as illustrated in Fig. 667. In addition to the extension through the casts which was carefully guarded, a large window was cut in the upper half of each cast and frequent adjustment of the fragments by lateral padding with felt within the casts was instituted.

Good union took place in both fractures and the clinical result is well illustrated in Figs. 668, 669. The x-rays (Figs. 670, 671) show some overlapping of the right and left fibulae but the tibial alignment is excellent and functional result in this

case is 100 per cent patient having practically full restoration of function at the end of six months

While I do not wish to enter into a discussion at this time upon the indications for operative procedures in fractures in the long bones yet I think it is well to emphasize three points



Fig 670



Fig 671

Figs 670 671—To illustrate case of Miss J Fracture of both bones of both legs

1 Every attempt must be made to reduce deformity in fractured bones by the closed method before operative procedures are thought of This can only be accomplished by repeated x ray pictures and conscientious effort on the part of the operator to utilize not only anatomic knowledge but sufficient time in the effort to overcome deformity

2 If after conscientious and repeated efforts it is found that the fragments of the fractures cannot be held in position one is

justified and it is his duty to advise upon treatment with or without internal fixation as may seem advisable

3 In general we believe the Lane plate is of the utmost value in the internal fixation of fractures of the femur but practically confine its use to this area. In the tibia our first choice is internal reduction without fixation and if fixation seems necessary our first choice is the beef bone screw or Parham band. This of course all refers to acute fractures and not operative procedure for non union.

However in the case of Miss J. where operative procedures were advised but refused the daily observation and adjustment of these limbs made possible the final clinical result which as stated is now 100 per cent.

COMMUNUTED COMPLICATED FRACTURE OF LOWER
END OF LEFT HUMERUS WITH GREAT DISPLACE-
MENT OF THE FRAGMENTS INVOLVEMENT OF
ELBOW-JOINT

THE following case is presented as it is a typical case of severe injury of the humerus and elbow joint and represents the type which is apt to cause considerable permanent deformity limitation of motion and dissatisfaction



Fig 672 —Comminuted fracture of lower end of left humerus

Mr P a young man was injured in April 1920 injury being caused by gloved hand catching in the crank of a cable reel the unwinding of which twisted the arm and threw him to the ground causing above described injury

In the treatment of these cases in the adult repeated efforts are necessary before the fragments can be satisfactorily replaced and in many instances replacement is impossible and every succeeding x ray picture seems to look worse than the preceding one. In fact these fractures are extremely discouraging from the x ray point of view whatever may be the end result.

In treating the complicated fractures of the lower end of the humerus the fundamental principles must be rigidly adhered



F 673 —Comminuted fracture of lower end of humerus

to. That is the reduction of fragments fixation of same and early mobilization of the joint.

In this particular case repeated efforts were made to mold these fragments into place but our efforts were futile and the deformity still remained the same from first to last as shown in x ray (Fig 672). The shaft of the humerus had been driven down between the two fragments represented by the external and internal condyle not only tipping them backward but

separating them as well and causing an acute angulation of their articulating surfaces. Operative procedure was in our opinion clearly indicated in this case and on April 8 1920 we operated upon the outer condyle and after replacing the fragment held it in position with a Parham hand and bone drill which was left *in situ*. It seemed advisable also to use a bone screw and one was inserted through the condyle of the shaft as shown in Fig 673. Subsequent x rays showed the inner condyle markedly

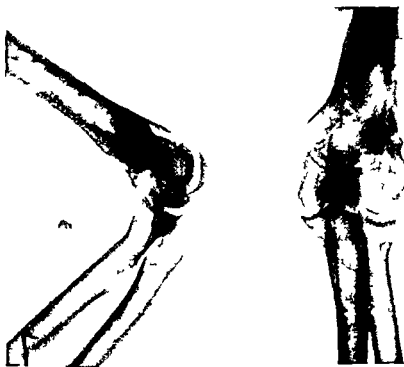
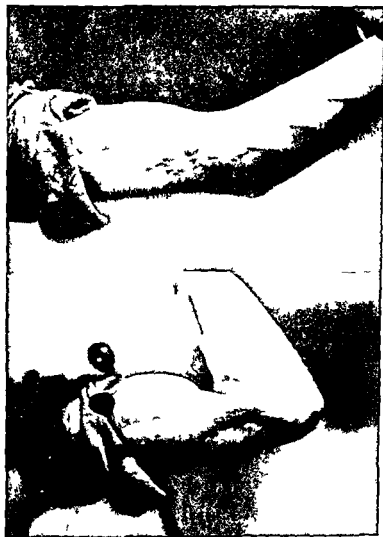


Fig 674 —Comminuted fracture of lower end of humerus

displaced and a secondary operation was made April 21 1920 at which time this condyle was fastened to the shaft in fairly good position and held in position by bone screw. Unfortunately the x ray showing the anterior view of this has been misplaced. Early passive motion was instituted in this case and ultimately a very satisfactory x ray picture was obtained as shown in Fig 674. Limitations of flexion and extension are well illustrated in Fig 675.

I believe this case demonstrated the necessity of courageously approaching complicated fractures near a joint by the operative



F g 675

method. If one is satisfied to accept the belief that these fractures are bound to cause limitation of motion, always have done so and always will do so, too much responsibility is imposed

upon nature and the result will always be bad. Therefore I feel operative interference is not only logical but is indicated and irrespective of the fact that with operative treatment some bad results are obtained nevertheless many cases will be improved and our experience justifies the grounds for instituting these operative procedures.

This patient at the present time has a very useful arm and although he had some involvement of the ulnar nerve for a time manifested by abnormal sensation and interosseous atrophy this has entirely subsided. Our notes also show he had some intermittent discharge from sinuses after removing the drill which necessitated removal of the Parham band and curetment and removal of the bone screws which evidently became infected. However sinuses healed completely and no unpleasant complications have occurred.

CLINIC OF DR. ARNOLD SCHWYZER

ST. JOSEPH'S HOSPITAL, ST. PAUL

A NEW PYELO URETERAL PLASTIC FOR HYDRONEPHROSIS

EVER since Fenger's publication in 1894 pyelo ureteral plastic operations for hydronephrosis due to pyelo ureteral strictures or kinks are accepted forms of treatment. In 1886 Trendelenburg made the first and very simple plastic (according to Kummell in *Chirurgische Operationslehre* by Bier, Braun and Kummell 1920). Trendelenburg opened the hydronephrotic sac widely and divided the spur which was formed by the parallel course of the ureter with the wall of the renal pelvis. The pelvis and ureter were split down to the point where the ureter left the pelvic sac. The mucosæ of the pelvis and ureter were then united by catgut.

Fenger split the pyelo ureteral stricture after the Heineke Mikulicz principle for pyloric strictures and united the upper and lower ends of the incision by suture, thus transforming the longitudinal incision into a transverse union. Both methods have been crowned by results in the hands of different operators.

The anatomic configuration at the pyelo ureteral junction may vary a great deal. At times an abnormal vessel was found to be the cause of the kink and was therefore divided. Each case has its individuality and the form of plasty is thus probably best conceived and decided upon when the peculiarities are recognized. Morris advised an operation practically identical with the procedure of Trendelenburg except that the pelvis is not opened so widely and the suture is not done through this opening in the pelvis. Kuester's method is adapted for cases where the stricture is a few centimeters below the pelvis. He

ties the ureter near its emergence from the hydronephrotic sac and resects the ureter to below the stricture. He then splits the end of the ureter for $1\frac{1}{2}$ cm. downward and implants this into the lower pole of the pelvis. Krogius advises to implant the split ureter into an opening made by a triangular excision at the lowest point of the sac. Albarran advised a lateral anastomosis between pelvis and ureter below the stricture. A ureteral catheter may be inserted from the convexity of the kidney emerging at the opening in the pelvis and entering the ureter again at the site elected for the anastomosis. This avoids constriction during suture and favors a proper relation of the parts during healing.

I only want to speak of the plastic methods for stenosis at the pyelo-ureteral junction and therefore will only mention without further discussion other ways of attack like nephropexy in case of floating kidney, nephrostomy, pyelostomy, pyeloplication or resection of the hydronephrotic sac, anastomosis between the hydronephrotic sac and the bladder and finally nephrectomy.

Of the plastic operations without complete division of the ureter from the pelvis all three operations mentioned (Trendelenburg, Fenger and Morris) are nothing else than a linear division of the stricture with the one end of the incision in the kidney pelvis and the other in the ureter below the stricture. The results of some of the foremost surgeons have not been very good with these methods and we read that as a rule the plastic operations are not very successful. This is my excuse for offering a different method though I only had the chance to try it in 3 cases. It is different in one essential point in that we try to avoid the difficulty one encounters in linear division. In this latter with the transverse suture of the longitudinal incision there exists always the tendency to the formation of a valve like fold from the part of the wall opposite to the suture. There occurs according to the sketches in some of the publications a good deal of puckering at the site of the new pyelo-ureteral union.

The method which I submit for your consideration is readily understood from the sketches which accompany the case reports.

Case I—Miss M R aged twenty one entered St Joseph's hospital on February 10 1916 with the diagnosis of appendicitis. She had had vague attacks of abdominal pain since she was nine years old. She had four attacks of appendicitis since the first of the year. There was tenderness over McBurney's point. Appendectomy February 11 1916 demonstrated moderate old inflammatory changes. On February 17th she complained of vague pain in the right lumbar region while she was sitting up. On palpation the area was bulging and rather tense. The pain became severe and the diagnosis of hydronephrosis was made. The urine was somewhat turbid the temperature

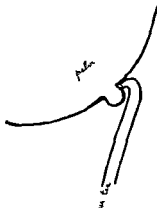


Fig 676—Case I Small diverticulum of renal pelvis with strictured ureteral opening in its roof Sharp kink of ureter

which had stayed below 99 F went up to 100 F and the patient vomited. On the following morning we withdrew by ureteral catheter 16 ounces of turbid urine from the kidney pelvis. This brought great relief. On February 21st we made the note that the urine after standing twenty four hours contained about 20 per cent by bulk of thick pus. It is worth while remembering this as it shows that even with this much infection conservative surgery is permissible. The temperature came down to between 98 and 99 F. There was less tenderness and the tenseness in the right side was greatly diminished. On February 25th the resistance was again harder reaching with its pole to 2 cm below the navel line. For two days this filling

had gradually recurred with diminished pus in the urine. On February 28th a pyelo ureteral plastic was made.

The kidney was found distended to the size of a newborn baby's head. The pelvis was incised. A diverticulum the size of a pea was noticed and in its roof the ureteral opening was found. It was greatly stricture. After freeing the parts the course of the upper end of the ureter became considerably more straight. A Y shaped incision was now made with its center about $\frac{1}{2}$ cm. above the ureteral opening. From here one leg ran downward into the ureter which it split for a distance of about 1 cm. The two other leg of the incision ran upward into the hydronephrotic sac with an angle of about 60 degrees between them. Each of the three branches of the incision was about $1\frac{1}{2}$ cm. long. The tip of the triangular flap in the kidney pelvis was united by catgut with the lower end of the slit in the ureter avoiding the mucosa. On each side sutures approximated the cut edges in such manner that the folds which always must occur were well up in the wide portion of the pelvis while at the ureter junction the parts were smooth. The upper end of the ureter thus became funnel shaped. Two catheters were now inserted from the convexity of the kidney, one into the ureter the other only into the pelvic sac. The former was removed after two days the one in the kidney pelvis after three. On March 25th the patient left the hospital in good condition. The urine rapidly cleared and has remained normal ever since. Upon inquiry in November 1922 the patient wrote that she is in perfect health and has been so since she left the hospital in the spring of 1916.

Case II—Mrs. C. L. K., mother of 4 children entered the hospital on February 21, 1919. She had been operated upon six years previously elsewhere for stone in the left kidney. Two weeks after the operation similar pain returned and kept on until two years later she was again operated upon. Some abnormal blood vessel were found at the renal pelvis and these—we are told—were divided. One month after the second operation the old pain reappeared. A steady dull ache

in the kidney area alternated with frequent attacks of severe colicky pains and vomiting at intervals of from two days to two weeks

On February 25 1919 we cut down upon the kidney found it of good size with moderate dilatation of the pelvis which was divided into two channels Both pelvis ended in narrowing outlets to join the unusually small ureter which was of a size hardly larger than an ordinary parlor match The upper pelvic outlet was kinked and somewhat doubled up on itself Though the case was not very promising on account of old fibrous changes and the narrowness of the ureter we made the flap plastic The

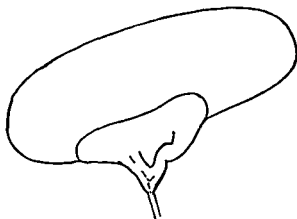


Fig 677—Case II Bifid pelvis moderate dilatation of pelvis exceedingly narrow ureter Some stricture of pyelo-ureteral junction Kinked course of upper branch of pelvis Y shaped incision indicated by dotted line

patient left the hospital four weeks after the operation with the wound healed up to a superficial area She was free from pain I am informed that later on from time to time the patient had pains from which she was relieved by morphin In March 1920 she was operated upon for ruptured ectopic gestation and died This case had not appeared very suitable for the flap operation but the kidney was large and looked healthy and we did not want to sacrifice it without trying a plastic

Case III—A girl of seven years entered the hospital on June 17 1919 She was brought in as an emergency case

suffering severely from pain in the left kidney region. The temperature was $99\frac{1}{2}$ F. There was pus in the urine microscopically though it appeared not markedly turbid. A large tumor three times the size of a man's fist in the kidney region was easily felt. The diagnosis was acute uronephrosis. Operation took place on that same day. The origin of the ureter was again—as in the first reported case—forming a sharp S shaped curve. This was straightened out by freeing the ureter and a flap plastic was done. The temperature remained elevated for

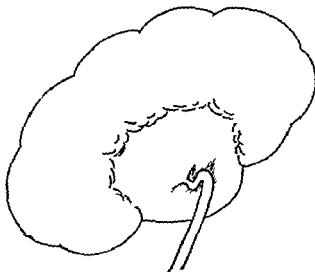


Fig 678—C e III Hyd n phro ng l of s v n y a s St ctu f pp rm t p t f uret r w th knk h ld firmly g n t pel by fib band

three weeks at times reaching 102 F. The wound needed much irrigating and care but the patient left the hospital in good condition with the wound practically healed on July 14th four weeks after the operation. A report from the patient's father received in November 1922 declares that the girl is in good health. Only when she catches cold does she have some pain in the kidneys. Before the operation she used to get a spell every eight or ten days.

The essential points of the method used in these cases are

First that the mucosa is not sutured but brought into exact apposition. This reduces the danger of formation of concretions. Second at the junction of the pelvis with the ureter the parts are in linear approximation. In the Fenger operation,

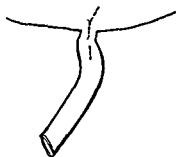


Fig. 679—Case III. Link in ureter freed. Y shaped incision indicated.

which follows the pyloroplasty principle, the parts have a great tendency to puckering and to separation after the catgut has given away. Unless however the two ends of the linear incision remain in good apposition there occurs a fistula with irregular wound healing. Third and more important, the slack and fold

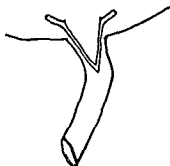


Fig. 680—Case III. Pelvic flap pulled down to lower end of split ureter. Slack of outer wound edge taken up at upper angles.

which is unavoidably produced by sliding the flap downward to the end of the slit in the ureter is taken care of at the upper end of the pelvic incisions and the ureteropelvic junction does neither become linked nor puckered.

Cases I and III were closely related in their anatomic pathology : *e* in the strictured and sharply kinked ureteral opening. Both were combined with a certain degree of infection the first one showing a large deposit of pus in the urine the second having considerable rise of temperature. Nevertheless both are now in good health six and a half and three and a half years after the operation. It is therefore permissible to try conservative measures in hydronephrosis even in the face of a moderate infection provided the infection has not brought on marked and lasting anatomic changes.

CASE REPORTS INTRODUCTORY REMARK

IN the following pages we report a number of clinical cases in which the history has often been shortened to avoid bulk. In most of these the only reason for their presentation is one or two interesting or unusual features. We may have dwelled longer than necessary upon some points which seemed instructive. I am afraid the selection of the material—which represents simply a few lucky results—betrays perhaps too large a measure of enthusiasm. But a surgeon needs some of this to help him over the dark days which come from time to time to every one of us.

All the reported cases were treated at St. Joseph's Hospital.

The sketches were practically all made by the writer directly after the operation or after examination. They are therefore very primitive in appearance. The gorgeously beautiful and elaborate pictures lavishly proffered in our present day journals are of course a fine feature when they are not used to cover up a meagerness in other respects. They are however not absolutely necessary in many instances and should not come to be considered a necessity.

A CASE OF SO-CALLED CRYPTOGENETIC SEPSIS

A patient was brought to me as a cryptogenetic sepsis with the severest chills I have ever observed and with temperatures of over 106° F. I shall report the case as it unrolled itself before us. Though this experience dates back ten years it seemed of enough interest to report it here.

It was a man whose previous history was very good. He was of robust build and of good state of nutrition though somewhat pale. He had never been sick until one evening (January 24th) he was taken with a chill lasting about twenty minutes. The temperature was not taken. In the night of January 25th he had another severe chill. There was no pain anywhere. On

January 27th the fever was measured for the first time. It ranged from 101.4 F in the forenoon to 101.6 F in the afternoon. On January 28th and 29th he again had a chill each day but his temperature was not taken except in the mornings before the chills when it was nearly normal. For three successive days he was then free from fever and chills. On February 2d he experienced a tremendous chill and the temperature shot up to 103.6 F. The patient was then hurried to St. Paul where he arrived in the hospital at 2 P. M. on February 3d. His temperature was then normal but within an hour a formidable chill

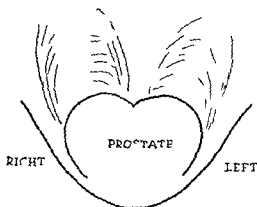


Fig. 681.—Sketch made February 3, 1913. Findings of the examination. Region behind prostate on right side tender though not very distinctly. It more globular than on left side also more bulky though on the left side somewhat bulkier than normally.

overtook him and the temperature rose to 106.4 F (per rectum). Pulse 144. The patient vomited. Our examination revealed very little. There was a trace of jaundice. The abdomen was somewhat large but the patient declared it was normally so. The region of the gall bladder was a little tender though not distinctly. Much as we tried to get some clue the patient remembered nothing abnormal about himself. On questioning he thought he had had about three weeks previously a slight secretion from the urethra for a few days harmless however in appearance and symptoms. The patient a very straight forward man and anxious to help us as he felt the imminent

seminal vesicles was a little bulkier than normal especially on the right side. These findings were not so that one could be entirely positive but I made a note of the fact that on palpation there was some tenderness on the right side behind the prostate in that somewhat rounded area which I took to be a thickening in the posterior part of the periprostatic plexus.

As the condition was apparently a very critical one and as the patient was anxious to have anything tried I opened his abdomen on the following morning (February 4th) for further investigation and in the hope of finding some definite pathology. It was of course evident from the chills and the temperature that we were dealing with a thrombophlebitic sepsis.

A median incision allowed us to investigate the pelvis but I had hoped to find at least some fibrinous deposit at the site of the supposed subperitoneal infection. Nothing however could be seen. The region of the right seminal vesicle seemed a little bulkier than the left. We decided—especially on account of the pain which had been noticed at the rectal examination—to ligate the internal iliac (hypogastric) vein. Some experience in surgical treatment of thrombophlebitic puerperal sepsis made us decide upon this procedure. The vein was ligated near its entrance into the common iliac. No thrombosis could be palpated along the distal portion of the vein. The upper abdomen was now explored. The gall bladder was tense and a small stone could be felt. Through a 2 inch incision upon the inserted fingers the gall bladder was pulled out, the stone removed and a drain fastened into it water tight.

Right after the operation the patient was in very good condition. For a whole week the temperature (rectal) ranged between 98 and 101 F. No chill or any unfavorable symptoms. We were satisfied that the apparent cryptogenetic sepsis had originated from the peripheral portions of the internal iliac vein or more specifically from the prostatic or seminal plexus on the right side. We figured that we had a prostatic infection of some kind of which the previous urethral discharge was an indication and that an extensive septic thrombosis in the periprostatic plexus had occurred with repeated discharge of septic material.

into the general circulation as demonstrated by the chills. We explained to the patient that we were not entirely safe against renewed chills as there was danger of progressive thrombosis over to the other side or backward toward the hemorrhoidal plexus. The possibility of having to ligate on the other side was mentioned. Sure enough after seven and a half days on the evening of February 11th a chill came on. The patient vomited twice and the temperature shot up to $103\frac{1}{2}^{\circ}$ F. Another chill occurred on February 13th and again on the following day each time with high temperature and vomiting. February 15th passed without a chill though the temperature rose to 104° F. On the next day it only went to 102° F. All this time while preparing autogenous vaccine from blood cultures we hoped for a localization of the process.

Finally on February 18th a distinct thickening was felt in the posterior prostatic region. Urination became painful. A perineal incision carried well upward and backward yielded 20 to 30 c c of creamy pus. On February 26th the patient left the hospital feeling well. We saw him again two years later he was the picture of health and had been well ever since leaving the hospital with the exception of an attack of pain in the gall bladder area lasting one day.

No doubt the ligation of the internal iliac vein had checked the thrombophlebitis sepsis long enough for the formation of an abscess of discoverable size.

The meagerness of the local symptoms as compared with the severe general septic picture gives the case its diagnostic interest. Would a primary perineal approach have been better? Would the patient have stood the mechanical trauma of such an approach? Would the danger of dislodging septic thrombi not have been too great? The pathology only gradually revealed itself. But it became clear finally as the case progressed with the exception of the original cause which remained a mystery until about six weeks after the discharge of the patient his wife was brought to the hospital in a serious septic condition.

Three weeks after our patient had gone home she started with severe pain in the lower abdomen marked tenderness on

palpation a temperature ranging from 100 to 102 °F headache chilly feeling and intense pain at defecation and urination She had been married eighteen years had neither children nor miscarriages Four months after marriage she had an attack similar to the present It had kept her in bed six months Since then she had had attacks at different times A profuse leukorrhea dates back to the first attack The husband now only remembers (!) having had a gonorrhea before marriage A pyosalpinx with foul smelling pus was at the bottom of this Thus after eighteen years the wife paid her diplococcic infection back in the currency of a secondary pyogenic mixture

DIVERTICULITIS OF SIGMOID DISCHARGING CONCRETIONS INTO URINARY BLADDER

Mrs K. McG. fifty one years old gave the following history on December 15 1921 Six years ago she had a fever for two weeks which had been declared to be typhoid Since one year she passes stones with the urine Sometimes a soft mass comes When this soft material does not appear for two or three weeks then stones come She showed us a paper box full of stones of irregular shape and of the average size of cherry stones Some others were 2 cm long and 6 or 7 mm in diameter They were not very hard and could be broken with moderate force by the fingers The onset of this condition a year ago was acute The patient was in great agony for four days Then a stone was passed and with this she was better Such stones were passed on an average of one a month Sometimes she passes two stones in one attack On December 15th she passed the last one

The examination in the office yielded no positive findings The chest and abdomen negative except some moderate tenderness on pressure low down in the abdomen Virgo intacta Hymen very narrow urethra somewhat dilated In front of the uterus a rather indistinct resistance is felt Washing of the bladder yielded brownish smeary material which smelled fecal Cystoscopically we found above the right ureteral opening a dark hole partly covered by a little knob like a sentinel pile The mucosa

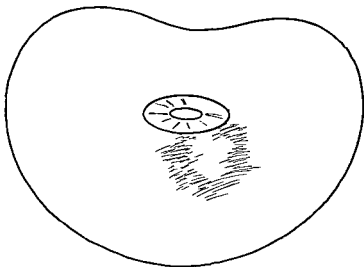


Fig. 683—Palpatory findings before operation. The vague thickening in front of the uterus is on the left side of the median line while the opening in the bladder is above the right ureteral orifice and the fistulous tract ran into the left side of the rectosigmoid. The diverticulum must have laid across the gut with its distal end near the right side of the bladder. Later inflammation and shrinking probably pulled the portion of the bladder over to the left.

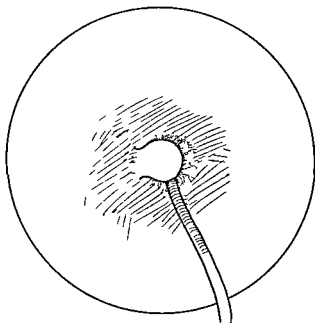


Fig. 684—Hole in the bladder with ureteral catheter inserted. A knob of tissue partly covers the opening.

covering of the epiglottis was removed with the mass. The adjoining muscular tissue was widely excised with the tumor though there was no visible or palpable infiltration to any marked degree. The tumor bed after its removal showed normal looking glossal musculature everywhere. The lingual artery had been tied the steps of the operation were performed slowly always being careful to be in control of the bleeding. The tumor bed was sutured with chromic gut and the digastric tendon reunited. The lower part of the anterior pillar of the tonsil was united with the tongue laterally and in front of the epiglottis. Silkworm united the skin after the wound had been swabbed with 2 per cent nitrate of silver. A gauze drain soaked in tincture of benzoin was inserted.

The primary tumor gave the same microscopic picture as the glands had shown. This primary tumor was somewhat pedunculated and the base was surprisingly free. There was no outspoken infiltration of the muscles at the base of the tumor to be found when the specimen was examined. The fact however that the tumor sprang from the navicula where the lymphatic rete is very rich explains why the glands were so much affected from a still rather slightly advanced primary growth.

Before the wound had been closed 50 milligrams of radium were inserted into the musculature of the tongue in front and above the hyoid bone. Close watch was kept for possible symptoms of edema of the glottis. The radium was removed after twenty seven hours. The foot of the bed remained elevated for a week and the patient had to lie with his head constantly low and turned face downward. The feeding was a difficult problem. He received principally Bulgarian sour milk which he had to drink with the head low and under close watch. A slight Trendelenburg position was constantly maintained as pneumonia by aspiration was now the greatest danger. Only after the patient had become more able to clear his throat was the position changed for part of the time. There was of course much leaking of secretion saliva and food through the wound. The radium surely did its share in hindering wound healing but this had to be accepted in the bargain. The middle portion

corresponding to the lodge of the submaxillary gland remained open and an annoying fistulous opening persisted with atrophic cicatricial walls. Radium in large doses was again applied as it did not seem proper to yield in any way in the big issue for the sake of saving the tissues around the fistulous opening. Thus its edges gradually retracted more and became thinner more cicatrized and harder as time progressed. The patient left the hospital on July 6th. In September a slough was removed from the area of the genio muscles where the radium had been inserted at the time of operation. We made the note that this slough looks more like a radium necrosis of normal tissue than neoplastic tissue though the general rigidity of the wall of the containing cavity was considered suspicious. The incisor teeth can be separated 2 cm. The tongue could be moved pretty well and could be protruded 3 cm. beyond the incisors. As the right hypoglossus and lingual nerves were resected when the tumor was removed the right side of the tongue was paralyzed and its sensibility greatly reduced. By November he had gained 15 pounds. Up to that time he had been obliged to eat while lying on the left side. The epiglottis was fixed by the scar formations. The large hole on the right side gave a disagreeably free exit for the liquid and semiliquid food which was the only kind he was able to swallow. However since the beginning of November he was able to eat while sitting up. Entering of the food into the larynx was not any longer as common as previously. Since October 11th the unusually courageous and energetic patient had gone back to his office to work. By January the fistulous opening had reached the size of a half dollar. The patient could close it somewhat while eating by forcible tilting of the head to the right side. In one way we were benefited by the opening inasmuch as it allowed us to inspect the very area of the tumor bed. For this reason we were not in a great hurry to close it. The epiglottis and the adjoining portion of the tongue lay freely exposed in the gap. The epiglottis was drawn to the right, almost directly to the wound. The protecting area of the tongue had a scarred firm aspect. There was no sign anywhere of a recurrence.

After a futile attempt in January 1921 to close or at least to reduce the opening a flap was formed of the skin over the sternomastoid reaching into the jugulum where the nearest healthy skin was available (March 28th). It was transplanted in several steps. It took but the union with the upper anterior border of the defect failed leaving a small opening. This had to be closed at a later session by a visor shaped plastic in which the healthy transplanted skin was undermined but was left attached on both sides laterally and in front. Three cm below the horizontal slit like fistulous opening a parallel incision was now made the undermined visor shaped doubly pedunculated area was then sutured to the well freened border of the fistula. Thus we finally had a firm closure of the very large gap in an entirely cicatricial and atrophic tissue. At present (April 1923) the floor of the mouth on the right side is only of the thickness of the skin. The head is now held straight the neck has limbered up considerably and it is remarkable how the tongue is free and even the epiglottis has again a more median position. Speech and swallowing have greatly improved even during the last year proving how these parts can rearrange themselves and how scars limber up by constant eager use. The operation was in June 1920 up to this time there are no signs of recurrence. The general condition and appearance are good.

CARCINOMA OF TONGUE AND TONSILLAR LODGE RESECTION

On March 21 1921 Mr A. G. B. farmer sixty two years old came to the office with the following history. Six years previously he began to notice a soreness of the tongue. From his description it seems to have been a harmless little marginal ulcer which healed on cauterizing with nitrate of silver. Then after feeling well for three years he received a kick from a cow on the left side of his jaw. Pain started under the left border of the tongue. At the same time he had pain in his ear. The condition never improved. In July 1920 the area was burnt twice with electricity and in September—we are told—raw carbolic acid was applied three times at weekly intervals. There exists now severe pain in the left ear. On the left side of the

upper jaw we first notice a round mass the size of a cherry which the x ray shows to be an encysted molar. The left part of the

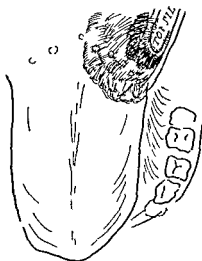


Fig 689



Fig 690

tongue near the palatoglossal fold is thick, hard and partly eroded. The mass has the size of a walnut. This hardness

goes over to the tonsillar lodge the lower half of which is invaded by the growth

On March 23 1921 a block dissection of the neck glands was made Both submaxillary salivary glands were removed with the rest The microscope could not detect any involvement of the lymph glands

On April 5th the main tumor was removed In ether narco is the lower lip was divided in the median line and the incision continued down over the chin to the hyoid bone Two holes were drilled into the lower jaw one near the midline the other about 1 inch to the left The outer left incisor was extracted and the jaw divided with the Gigli saw In another almost identical case difficulty had been experienced later on in keeping the two halves of the mandible in good and firm apposition During the sawing with the wire we therefore changed the direction several times in order to avoid slipping of the fragments later on After spreading of the jaw widely apart we tried to insert an intubation cannula on the top of which a short piece of a metal tube had been soldered for fastening a rubber tube about a foot long In larger operations far back in the mouth this had given us great comfort A sea sponge was usually placed into the pharynx and bleeding could not interfere with the respiration However in the present case we were not able to introduce the tube apparently on account of the rigidity of the isthmus faucium where our tumor was situated Still I thought we would get along without a tracheotomy but constant watch had to be kept on any bleeding The tongue was separated from the left half of the jaw by dividing the mucosa along the floor of the mouth Especially after cutting the region of the frenulum the tongue can be pulled far out and over to the opposite side As both (right and left) genio maxillary muscles remained attached to the right half of the jaw we were safe against a later falling back of the tongue and the parts were well exposed Keeping about an inch from the neoplasm the tongue was resected step by step The tongue and the tonsillar lodge running upward along the outer side of the palatoglossus muscle were removed in one piece The palate and adjoining

pharynx thus resected the wound was quite wide (Fig 690) but most of it could readily be brought together by suturing. The ascending palatine artery was the only vessel that bled after a clamp slipped. There was no marked dyspnea at any time. The condition at the end of the operation was fair.

The laboratory report was Carcinoma simplex of very cellular type. The tumor had been of rather slow growth and was only slightly ulcerated. It formed a rounded tumor. These cases are known to give a better prognosis than those with early extensive ulcerations.

Two and a half days after this operation (April 7th) our patient was unlucky enough to develop a strangulated femoral hernia due to much coughing though he had been kept constantly face down in slight Trendelenburg position. The hernia was operated upon in local anesthesia. The remainder of the postoperative course did not present anything of particular interest. On April 18th 50 milligrams of radium were placed into the tumor bed. It was left in for forty eight hours which gave him 2400 milligram hours at the very spot where we needed it. Some fear was of course felt as to a possible late erosion of a larger vessel by a radium slough when the patient would be out of reach but the patient had to be discharged on April 21st. He was in reasonably good condition but had considerable pain—undoubtedly from the radium. In September we injected 95 per cent alcohol into the third branch of the left trifacial nerve at the foramen ovale. In April 1922 a year after the operation he stated that he never felt better in his life than right then. He had gained 15 pounds since the operation. His main trouble had been the difficulty in opening the mouth but this was gradually improving. He could then separate the jaws $1\frac{1}{2}$ cm. About four months after the operation a small sequestrum came away from the line of division of the jaw. On March 2 1923 he came to the office upon our request. He had gained 35 pounds since the operation weighing then 170 pounds. His speech is not very distinct. The teeth of the lower jaw can be separated from the toothless upper jaw for a distance of 2 cm.

The teeth on the left side fit perfectly with those of the upper jaw however on the right side the lower teeth close entirely to the inner side of the upper ones. The food is taken in soft form but the patient is satisfied. The stump of the tongue cannot be protruded beyond the teeth but is moving painlessly within its narrow limits. About half of the tongue seems gone. No signs of any recurrence so far.

It is of course too early to speak of a cure but we are now glad we applied such a fierce dose of radium right in the start when there was most danger of dissemination. Protracted gentle radium treatment has never impressed us as being as effective except perhaps in skin cancers and in non malignant conditions.

ACCIDENTAL COMPLETE EXCISION OF THE HEPATIC DUCT

The frequency of gall bladder surgery and the trend to more active radical removal of the gall bladder in severe forms of cholecystitis brought forth reports of most unpleasant injuries of the bile ducts. In the case to be reported the whole of the hepatic duct up to its division into the two (right and left) branches was accidentally removed in excision of the gall bladder. The case is as follows:

Mrs T M sixth nine years old was admitted to St Joseph Hospital on October 10 1921. She had been suffering from sharp pain in the gall bladder area for four days. The pain never let up during this time. Her previous history gave no further information. She had always been well except during the menopause. Her general condition was good for her age. The liver dullness reached to the navel line and the area corresponding to the gall bladder was exquisitely tender to touch.

On October 13th a cholecystectomy was performed under local anesthesia with a little ether (3 ounces) during the deep work. The gall bladder was firmly adherent to the colon and part of the duodenum. It was tense and hard. The base of the gall bladder and the cystic duct were greatly thickened and inflamed and bled readily and continuously. The cystic duct was we thought made out. It was tied with formalized catgut.

and cut. On removing the gall bladder from within outward a cord about the size of a large cystic artery was tied. The

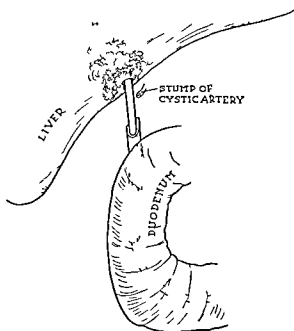


Fig. 691.—A catheter is inserted into the left hepatic duct and through the common duct into the duodenum. It is fastened to the cystic artery, the only reliable fixed point to be found.

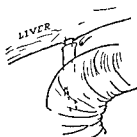


Fig. 692.—The common duct is approximated to liver. The stump of the hepatic duct not being found, the common duct is simply brought up to the point of emergence of the catheter.

gall bladder was removed without being opened. Some smaller vessels were tied; the liver bed was not sutured, but a rubber

tube and a collapsible rubber drain were placed in the sulcus and the wound closed. We were uneasy and feared some trouble with the ducts. While the assistants finished closing the wound we started examining the removed gall bladder. It was greatly thickened and contained a stone of the size of a plum. The interior of the sac was necrotic stained green. The cystic duct greatly thickened ended free which caused a sigh of relief. But alas! on closer examination a channel $1\frac{1}{4}$ inches long was found underneath and parallel with the cystic duct and intimately glued to it. This channel became rather wider toward the upper end where one could see that it was cut off just at the beginning of a bifurcation. A frozen section showed epithelial lining.

We hoped that we had only removed an abnormal right hepatic duct which perhaps joined the left hepatic abnormally low down. In the dictation given at the time I said. The patient with her sixty nine years would not stand an immediate reopening of the wound and we feel that we should first watch what happens before going in again. In this way the very acute infection may subside a little and we can find out if we really have removed part of the common hepatic or only the right hepatic duct. We decided then and there that if conditions permitted we would wait six days for the eventual reopening of the wound. By that time the patient is generally pretty well over the ether and operative shock and still the wound can be opened readily without much force or bleeding. In our case we hoped to still find the ligatures of catgut as landmarks.

Four days after the operation October 17th the wound started to discharge bile profusely. Pulse and temperature were good the former ranged between 68 and 80.

On October 19th six days after the cholecystectomy we reopened the wound with no difficulties. The wound showed very good healing. Four ounces of ether were used during this operation which lasted one hour and ten minutes. Too much emphasis cannot be put upon a proper use of the anesthetic. Most of the operation was done with hardly any ether. Our

anesthetist Miss Gronvold knows how to get along with the smallest possible dose with the help of cheerful encouragement. The wound had to be enlarged 1 inch upward and the same downward. The right lobe of the liver was lifted out and fresh adhesions divided. Gradually we gained a view of the parts after sufficient time had been given the oozing to stop. A stump was found with a ligature around it, from its location this might have been the tied off hepatic duct. However on untying the ligature and trying for an opening blood came in spurts. It was the cystic artery and was tied again. This stump was located far up directly at the posterior end of the raw liver surface. In an area of granular and apparently somewhat torn liver tissue which corresponded to about the innermost portion of the gall bladder bed we noticed oozing of bile and succeeded in running a sound—a thick uterine probe—into what we considered the left hepatic duct. We knew from the specimen that the hepatic duct had been divided at the point of division into the right and left hepatic branches. A small catheter (No 14) cut on a slant so as to have a soft pointed end, was then inserted into this left hepatic duct for 2 inches and sewed with forty day chromic catgut to the stump of the cystic artery as there were no other firm tissues to get a good hold on. The wall of the duct could not be found by the searching needle. It had surely been divided at a point within the liver as it was pulled forward with the gall bladder. The stump of the artery with its firm tissue and itself barely alive on account of the ligation was a most welcome fixed point which would not readily dissolve the catgut. We then found the cut end of the common duct embedded in plastic fibrinous material behind the upper border of the duodenum. The catgut ligature greatly helped us in finding it. The ligature was untied some colorless fluid escaped. The probe would only enter downward. We dilated the papilla of Vater and pushed the catheter which measured about 4 inches from its fixation to the cystic artery through the choledochus into the duodenum. The cut end of the duct was brought up to the point where the catheter emerged from the liver and fastened again with forty day catgut. There

had not been time for any scar formation and the tissues could be approximated without any traction. This was surely due to early intervention. The catgut which brought the common duct up grasped only the liver tissue in the immediate neighborhood of the emerging catheter but this seemed sufficient as the



Fig. 693.—Catheter placed in the common duct through the abdominal wall (usually) after a day or two.

parts were lying in free and easy apposition. Soft rubber drains were inserted into the neighborhood of the anastomosis leaving an interval of an inch. One rubber tube was introduced into the common duct. Closure of abdominal walls.

For two days after the operation the pulse was very high

but it came down with digitalis. The temperature remained normal with exception of a short spell (with a chill) which lasted only a few hours. On November 14th (twenty six days after the second operation) the patient was discharged from the hospital in good condition. For two days the feces had been colored and the discharge of bile from the wound had decreased. It stopped entirely promptly after that and our patient improved steadily.

† Ray pictures which were taken at different times show the tube to be still in place. It is in exactly the same position now (April 10 1923) and has the same curve as at the time of the first x ray examination soon after the operation (Fig 693).

Note—The lucky outcome appeared to be due to early recognition of the damage done before cicatricial changes had time to take place. The common duct was readily brought up to the liver and the parts reposed in good apposition without any tension. Perhaps the anchoring of the rubber tube to the cystic artery gave an extra firm fixation. At no time has the patient complained of pain. There is no jaundice and with her seventy one years she does the cooking and baking for the family. All last summer she took care of a large garden daily carrying pails of water. Why does the tube not come away? Perhaps the fixation with forty day chromic gut to the artery stump kept it long enough in place to cause some incrustations? The x ray does not give any such shadow though the tube is very sharply outlined. The intraduodenal portion has exactly the same density as the intrahepatic. What is going to happen? As long as the patient is feeling well and has no jaundice we may well be satisfied. The longer the tube is in place the more we are sure of good epithelialization and the less do we have to fear a final stricture.

A COMPLICATED CASE OF NEPHROLITHIASIS

Mr J W forty five years old came to see us nine years ago for severe pain in his left kidney region stranguria and turbid urine. On November 4 1913 a cysto copy was made and the left ureteral opening was found inflamed. Catheteriza-

tion of this ureter yielded pus. Microscopically pus cells and cocci were seen, no tubercle bacilli. The general appearance of the patient was good. He was strong and fleshy.

On the following day the left kidney was laid bare. There was marked perinephritis. An abscess was found in the upper pole which was opened. The inserted finger felt a number of stones. Since there was no normal kidney tissue present the organ was removed. It had been reduced to a functionless sac containing many stones, the largest of them measuring $2\frac{1}{2}$ inches in length and $\frac{1}{2}$ inch in diameter. November 8th the bladder was irrigated. Urine clear, no odor. The course was then smooth until November 22d when the temperature rose suddenly to 105° F. severe pain in the right side occurred and no urine was passed for eighteen hours. Hot packs seemed to relieve the condition. In the following twenty-four hours 76 ounces were secreted and the patient felt better. On November 24th he grew worse again, the temperature rising again to 103° F. The secretion of urine stopped and there was no urine passed from 9 A. M. until 11 A. M. the following day. X-ray plates gave no information. The abdomen was large and firm. We then catheterized the right ureter and found an obstruction 3 inches from the ureteral opening and decided to operate without delay. An extraperitoneal incision was made in the right side with its midpoint inside the anterior superior iliac spine. Two small stones were removed from the ureter. There was a gush of urine from above with some flakes of pus. The ureter was now free up and down. A small constriction at the point where the stones were seated was dilated and nicked. No suture of the ureter, soft rubber drains to points $1\frac{1}{2}$ inches below and above the ureter wound. On December 1st we made the note: Wound practically closed. On December 16th the patient was discharged. The ureteral meatus looked normal and the urine was acid though not entirely clear.

On January 16th our patient was readmitted to the hospital. He had had no trouble to speak of since leaving the hospital though small particles of carbonates and phosphates had come away. The urine had been kept acid by large doses of benzoic

acid and urotropin. On January 15th at 11 P M he had rather severe pain in the right kidney region. He had urinated just before. Then at 5 A M he passed 2 ounces none since. He returned at once to the hospital in the morning of January 16th. At noon on January 16th 3 ounces of concentrated urine were recovered by catheter. The ureter was permeable. The trouble seemed located in the kidney pelvis. Vomiting occurred repeatedly that day and in the following night. The temperature rose to 102° F on the following morning. I found no record of x ray examination at that time. Blocking of the only kidney left unrelied for any length of time could not be allowed. We thus had to cut down upon the remaining right kidney (January 17th). It was as one would expect quite large. The finger detected in the pelvis a sharp hard object. Through a small incision into the pelvis a stone 2 cm long and 1 cm wide was removed. A gush of purulent fluid followed. The pelvis was further explored with a probe and found free of stones. The ureter allowed a ureteral catheter to be passed freely down into the bladder. No suture of pelvis. Four soft rubber drains were inserted toward but not directly to the pelvic opening. The patient was comfortable immediately afterward. At first the urine came through the wound but on January 20th note was made that all the urine went into the bladder. The temperature had promptly come down to normal and as the patient was feeling quite well and extremely anxious to go home he was allowed to be up on January 30th and discharged from the hospital on February 2d.

Three weeks later he consented to be demonstrated before the Ramsey County Medical Society. He was proud to show the three long scars which on his fleshy abdomen had almost girdled him and he declared he felt well. But at 9 P M on the following evening (February 25th) he began to feel uneasy. A slight pain in the right kidney region gradually increased to great severity at 2 or 3 A M. He vomited ten or twelve times before morning. There was no urine passed since 3 P M. The patient who had a good deal of experience by that time declared 'the pain is in the right kidney'. The temperature was 100.8° F,

pulse 96 when he was again brought to the hospital at 8 A M on February 26th. In the afternoon the temperature went to 101.6 F. Directly after his arrival at the hospital he was cystoscoped. Some little pus flakes were seen in the bladder and in the right ureteral opening. The ureteral catheter could only be inserted 2 inches. There was complete retention. After the catheterization the patient was asked about the pain in the right iliac region. He now stated that he had pain in this region different from the pain earlier in the attack when it had been located in the right kidney. The patient could be kept comfortable with morphin and the general condition was good. Therefore we waited a little while longer for further developments, the most likely condition being a stone which had traveled down the ureter in this short time. We reasoned that if it had traveled so rapidly it might promptly progress further. Notwithstanding the wonderful fortitude of our patient we were of course reluctant to reoperate if there was any chance to avoid it. On the same evening (February 26th) the right lumbar region presented a marked bulging and the integuments appeared infiltrated so that it became necessary to incise and this was done early next morning. An incision was made at the site of the pyelotomy scar. The fat layer was distinctly succulent and the tissues were edematous. Below the superficial layer friable hemorrhagic tissue was noticed and on exploration with the finger much bloody fluid of urinous odor appeared. Neither the touch nor the eye could detect in what layer we were but the smooth surface and funnel shaped walls in the depth made us think that we were within a hydronephrotic kidney. Some idle pockets partly (as we thought) in and partly outside the kidney were stretched open. Catheterization of the ureter was attempted but was not successful. Two medium sized urethral catheters were left for drainage in the depth of the funnel shaped cavity. It must be added that just previous to the operation the patient had passed 6 ounces of saturated urine normally.

The patient had a good night following the operation. No morphin was needed. The next morning (February 28th) 10 ounces of bloody urine were passed per urethram though the

dressings were of course saturated with urine. The course from then on was surprisingly smooth. On March 20th a cystoscopy was done. The bladder showed hemorrhagic areas the ureteral openings looked normal. On March 27th he was discharged with the wound nearly healed. The urine had cleared up considerably. Large doses of *folia uvæ ursi* tea were administered and the urine flowed freely. Thirty six ounces were recorded as passed during the night before he left the hospital.

Since then our patient has been in what might be termed very good health. I saw him often for years afterward working as switchman for the street car company at a busy corner. He was given a rather light job but had to be on his feet for many hours.

On March 12 1923 I happened to see this patient by accident. He declared that he felt 'first rate'. He has no pain except that he feels better if he wears a belt for support as his weight is about 200 pounds. He works every day does the hard work of a packer in a wholesale dry goods house and is the picture of health. The urine is 1028 of dark yellow color contains a small trace of albumin (just noticeable). No sugar. No trace of turbidity.

To recapitulate

- 1 Left sided nephrectomy for stones pus and complete sclerosis
- 2 Three weeks later Right sided ureterotomy for stones and suppression of urine
- 3 Seven and a half weeks later Right sided pyelotomy for stone with suppression of urine
- 4 Six weeks later Urinary phlegmon in right kidney region